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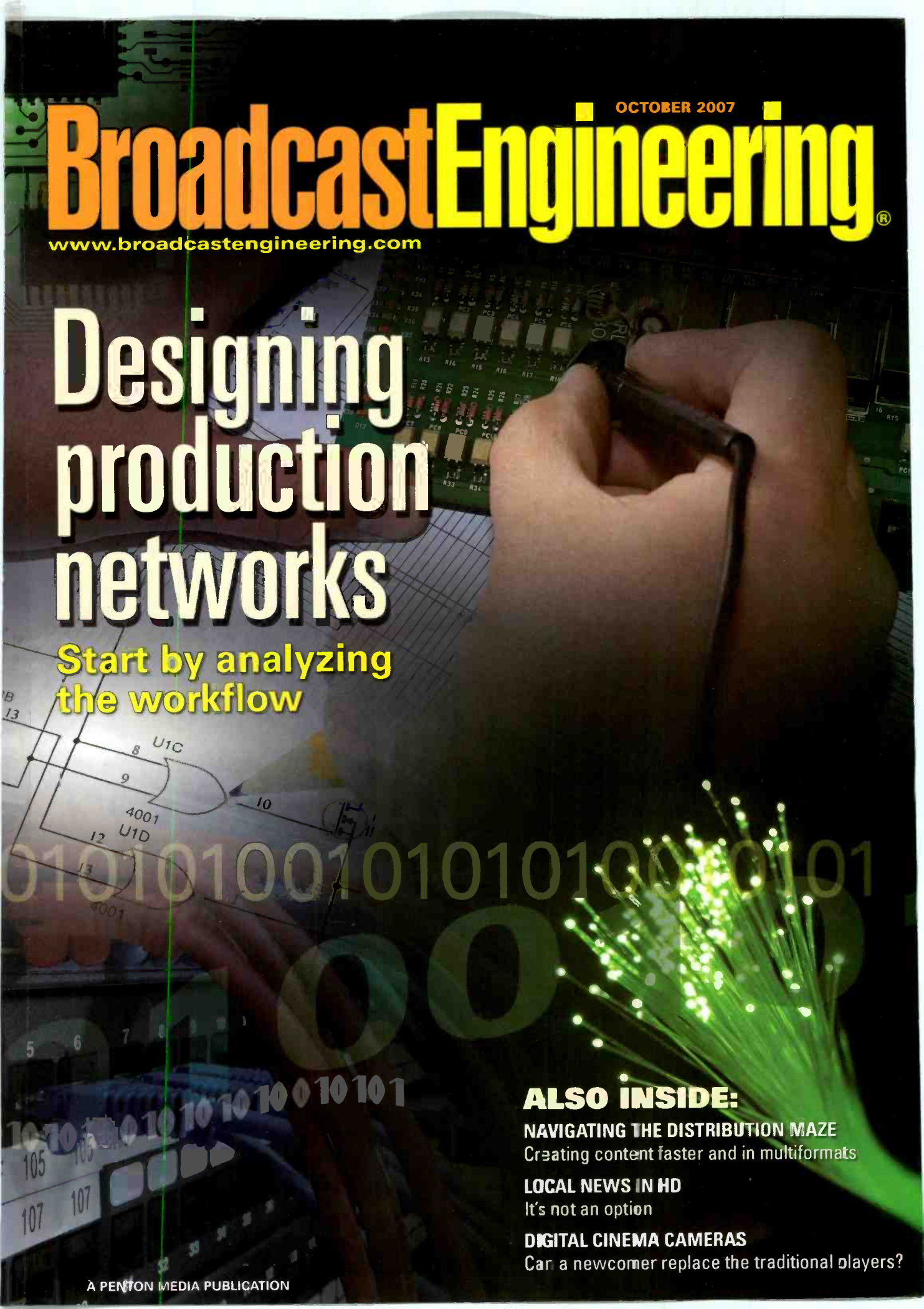

Designing production networks

Start by analyzing the workflow

ALSO INSIDE:

NAVIGATING THE DISTRIBUTION MAZE
Creating content faster and in multiformats

LOCAL NEWS IN HD
It's not an option

DIGITAL CINEMA CAMERAS
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A PENTON MEDIA PUBLICATION

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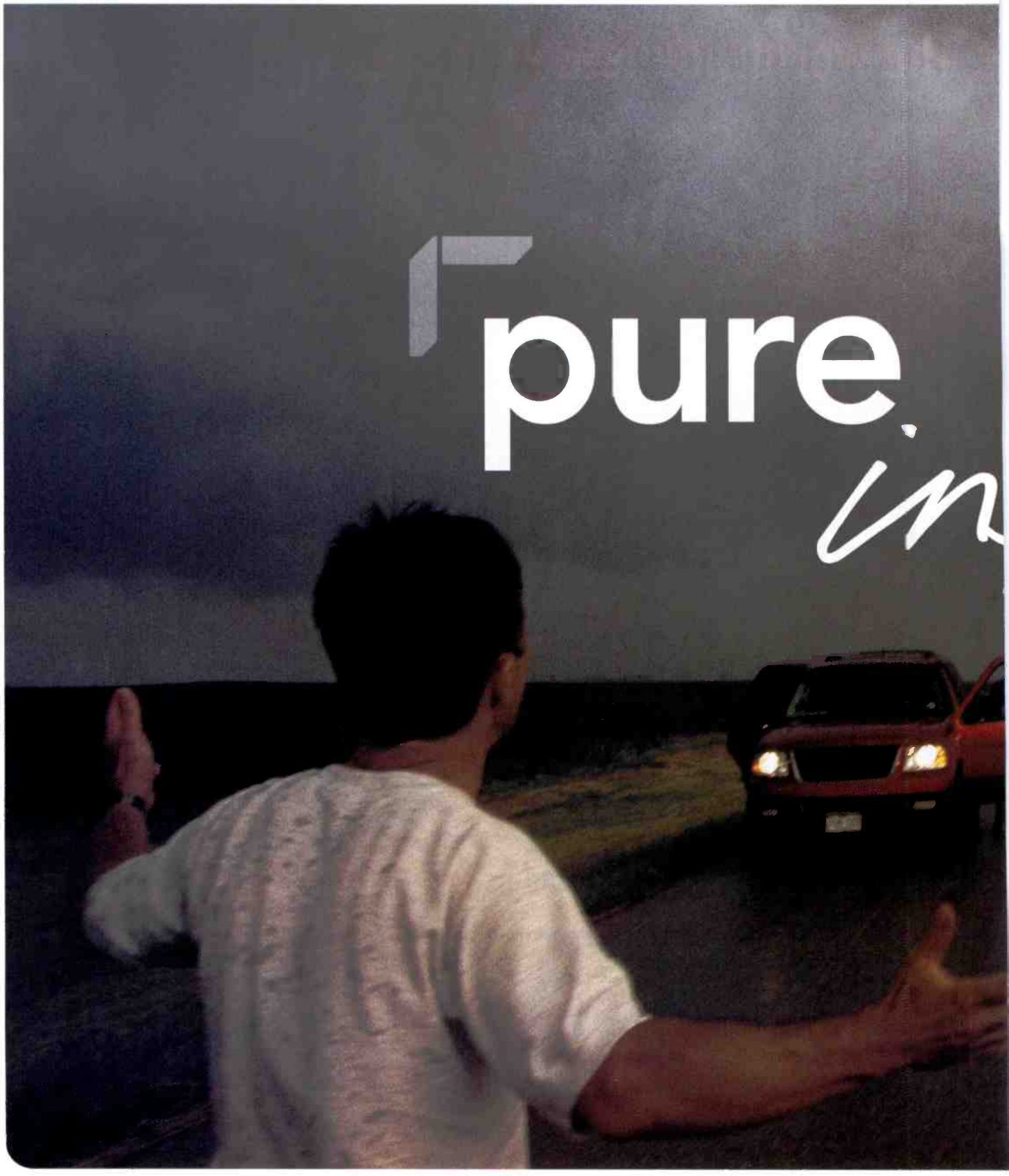

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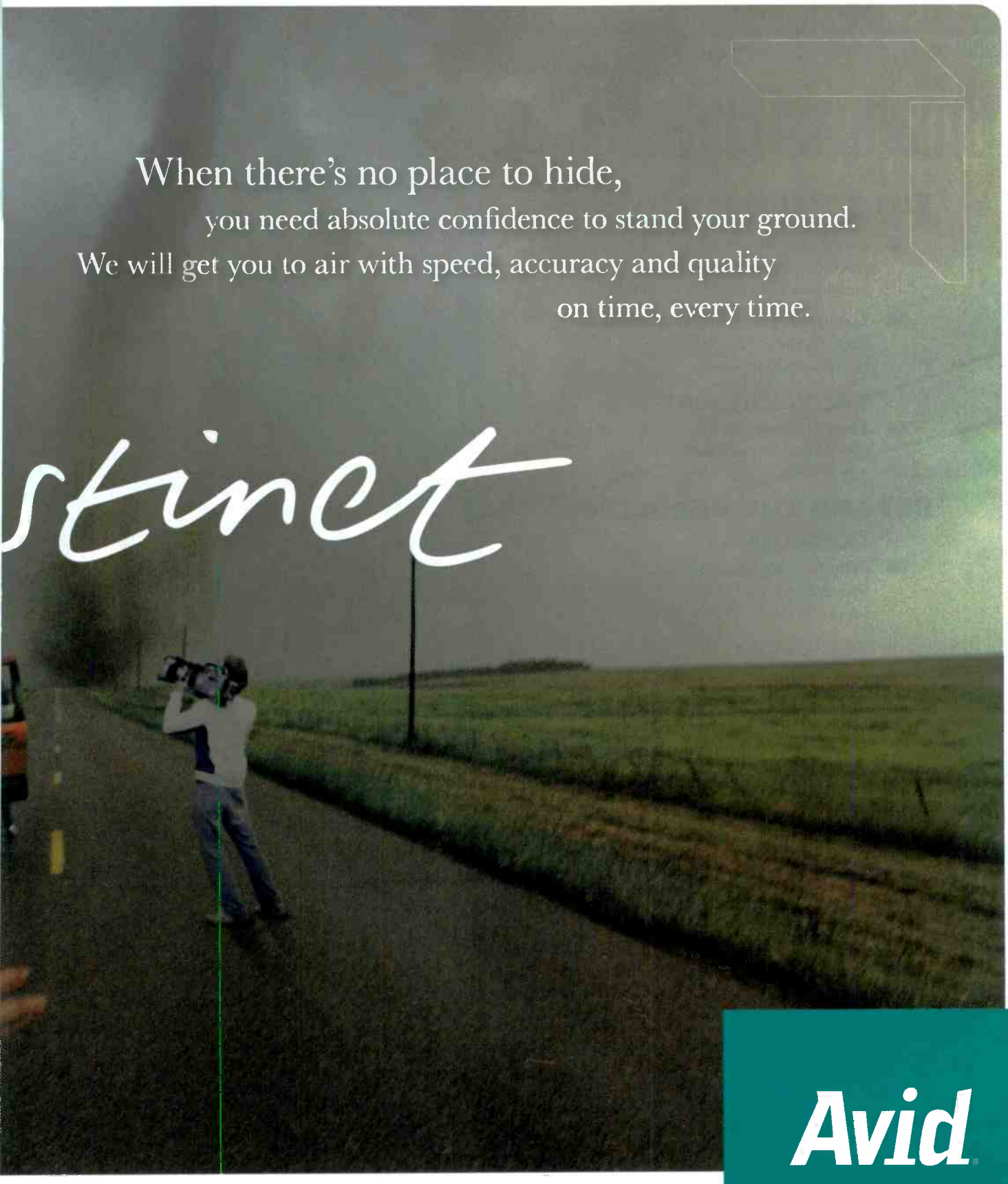
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ON THE COVER:
Video network architectures help broadcasters minimize downtime and maximize throughput. Concept cover created by art director Robin Metheny.

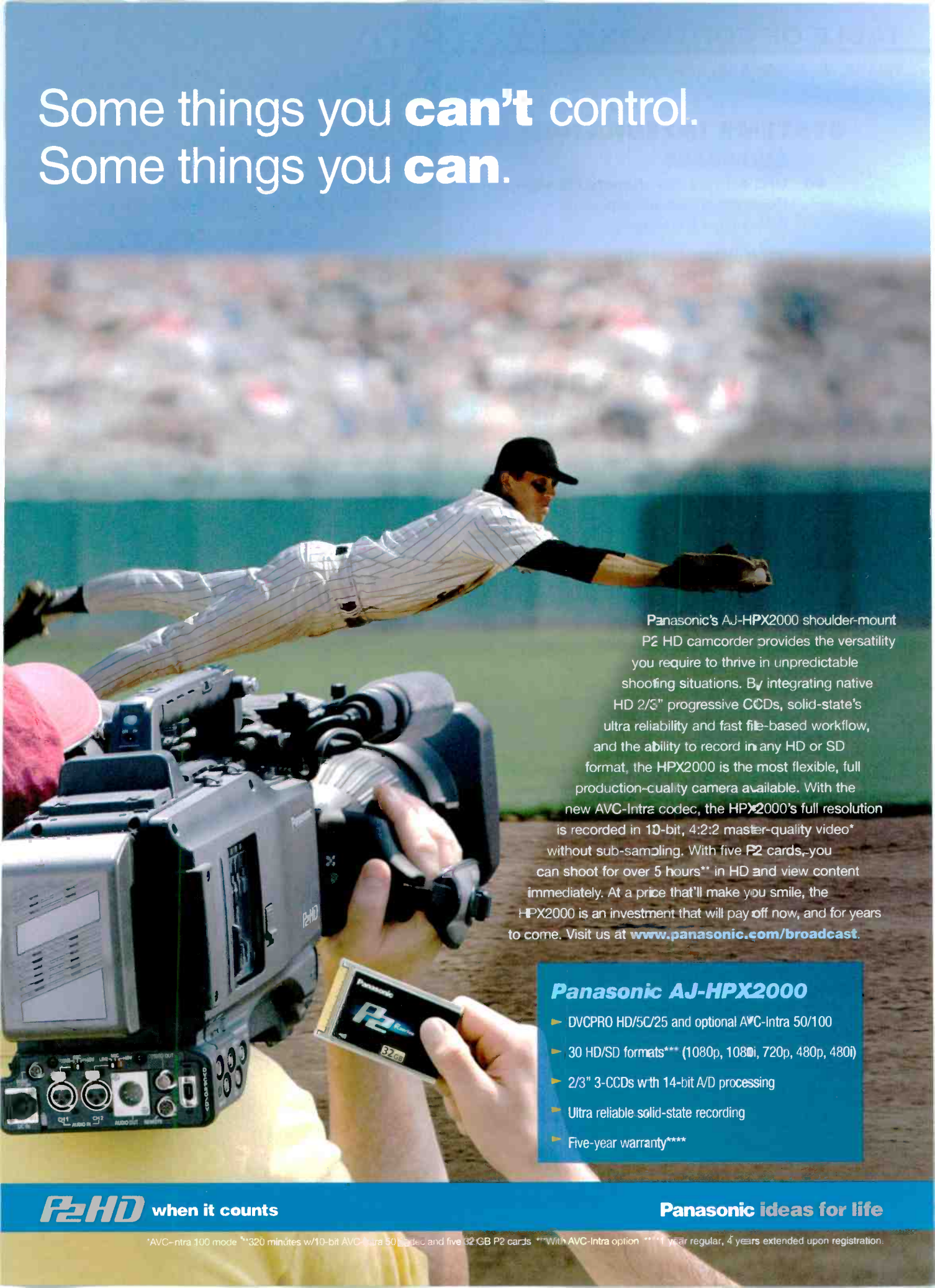
THIS MONTH'S FREEZEFRAME QUESTION

Ten years ago this month, these marketing phrases appeared in *Broadcast Engineering* magazine. Match the phrases shown on the left to their respective companies shown on the right.

Readers submitting winning entries will be entered into a drawing for *Broadcast Engineering* T-shirts. Enter by e-mail. Title your entry "Freezeframe-October" in the subject field and send it to: *editor@broadcastengineering.com*. Correct answers received by Dec. 1, 2007, are eligible for the drawing.

Advertising phrases	Companies
1) DTV ready	NDS
2) The DTV solution for every resolution	Philips
3) Digiclean	Panasonic
4) Next generation television and video	Snell & Wilcox
5) The answer is always	Sony
6) It's Un-Reel	Dolby
7) Next level solution	360 Systems
8) We're bringing tomorrow together	Harris

Some things you **can't** control.
Some things you **can**.



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P2HD when it counts

Panasonic ideas for life

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AUGUST'S FREEZEFRAME ANSWER

Q. Video server one has an MTBF of 10,000hr and an MTTR of 1hr. A second video server has an MTBF of 1000hr and an MTTR of 3.6 seconds. Which video server has the higher availability? Provide its average.

A. Server two has the higher availability. Server one has an average of 99.99 percent. Server two has an average of 99.9999 percent.

AUGUST WINNERS:
Noto Art, Jim Barnes, Mark Ferrell, Michael French, Arturo Linares, Steven Wilson

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The FCC's DTV trick or treat

It's that time of year again. Your doorbell rings and when you answer, you're greeted with little costumed munchkins begging for candy and promising tricks if you don't deliver. Looks like the FCC is about to do much the same. In midsummer the commission announced that TV broadcasters would be required to file a status report on their DTV build-out.

This document, called FCC Form 387, is due Dec. 1, 2007. If your station is already at full, post-transition channel and power, you'll get a treat: no governmental hassle. If not, look out. This form is full of tricks for the unwary applicant.

The FCC calculates completing the form will require two hours each of legal and engineering assistance at an estimated cost of $700. Don't believe it. Similar bureaucrats required six months and 175 work hours to produce a brownie recipe that ended up being 22 pages long!

While the DTV status report form isn't terribly lengthy, it does require some data gathering. For instance, you'll need to know your current and future power and channel of operation. In addition, you'll need to supply the ethnicity of your current and future viewers along with their household income, the ages of each household member, the type of car they drive and, oh, their shoe sizes.

That won't be as hard as you first might imagine. Homeland Security and the NSA have been gathering this information for several years. Unfortunately, you'll need to submit a Freedom of Information request to get it.

Upon close examination of the questionnaire, it may appear that the commission is setting a trap for unsuspecting engineers and managers. Some example questions:

Are you operating:
a) post-transition PTA
b) post-transition STA
c) a TV station without a license or permit of any kind? *Note: Don't check answer C. If your station is not yet at full DTV power, look out because the FCC wants to know why.*

Are you not at full post-DTV operation because:
a) the station hasn't yet started building
b) the station is in the midst of construction
c) you don't plan on doing anything because you still think the politicians will put the kibosh on the whole DTV idea?

Section four is a labyrinth of other gotchas just waiting to snare station personnel. The form wants you to specify exactly what equipment you need to finish construction. It asks: Do you need an antenna, transmitter, tower crew or any other equipment we could sell you? Personally, I think someone at the FCC is collecting this information for resale to vendors.

Now, we're down to the last question, and if answered properly, you're off the hook. That question is: Are there any environmental issues beyond your control that are preventing you from completing your DTV facilities? Here's your out. Just answer yes, and say that global warming is the reason you haven't finished construction. Say you've complained to Al Gore about it but haven't heard back.

So, there you have it, the FCC's DTV trick-or-treat examination. If you're lucky enough to have finished your DTV transition, congratulations. If not, hurry up, or you could be left holding an empty DTV bag. BE

Brad Dick

EDITORIAL DIRECTOR
Send comments to: editor@broadcastengineering.com

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www.miranda.com/KX

Miranda

NBC's non-HD redux

Dear editor:

I was reading the *Broadcast Engineering* August 2007 Feedback column as I flew home from a recent NBC Sports assignment at the Deutsche Bank Golf Championship in Massachusetts. I am employed as a freelance video technician with both CBS and NBC, covering many golf events each year.

CBS and NBC truly have two distinct technical philosophies with regards to the technical savvy they employ. There is the professional network (CBS) and the "do something to get by" network (NBC). As with all things in broadcasting, budgets probably drive the bottom line. NBC hires NEP to provide the HD production facilities, which included the ND3 and ND4 production trucks at the Oakmont U.S. Open Championship in July. These are fine 1080i facilities with state-of-the-art technologies. Sony provided the HD cameras.

What sets NBC in a distant second place behind CBS is NBC's reliance on SD cameras for handheld cameras and mobile hard cameras. NBC still relies on BVP900 and BVP950 to be upconverted to 1080i and cut into true HD content. I don't know if NBC's RF vendor, Total RF, has yet to provide reliable RF equipment for NBC or if the network is just not willing to pay for the technology. Total RF is also responsible for all the fiber optics laid on a golf course, covering all audio, video and HD cameras. NBC's attitude is to give this work to someone else rather than train its own employees on the new technology. Maybe NBC management thinks the average viewer is too stupid to know the difference between cameras?

CBS, on the other hand, hires NMT to provide HD production platforms that are equally as refined as the NEP trucks. NMT and NEP's trucks are both equipped with Sony HD cameras. What propels CBS to the forefront of the technology is its commitment to a complete HD production. CBS hires BSI to provide all the RF camera audio facilities — tasks that BSI does extremely well. BSI does not provide the fiber for cameras or field audio, thereby keeping its technicians focused on their craft — RF.

CBS management takes pride in its technicians by training them in new technologies and by keeping work within the domain of CBS. CBS has embraced an efficient master plan for golf. Fiber is run directly from the mobile unit out to the camera location. At each end of the fiber, CBS installs optical interfaces from Telecast, adds local power at the camera end, and within a matter of minutes of establishing links on the fiber, the camera is up and functioning. This is not the case with NBC. Total RF had total jurisdiction on fiber and all the Telecast equipment. When NBC has camera or audio problems, there are too many outside influences. This results in less-than-speedy problem resolution or sometimes the comment, "Not my problem."

As one of the technicians that sees golf from two network perspectives, I thought this would shed some light on the visual eyesore.

Name withheld by request

DTV information is available — at a cost

Dear editor:

I read the June 26, 2007, article titled "CEA publishes DTV interface standards" in the *Broadcast Engineering* e-newsletter *HDTV Update*. What the CEA is doing to help the consumer is great, except for one thing. While it has published standards designed to help viewers (a vast majority of whom are already confused when it comes to this subject) set up and control DTV accessories, the CEA doesn't make it easy for the consumer to get the information found within the standards because it charges consumers for the information. Making the information publicly accessible at no cost to the consumer would be a much better way of helping the consumer.

The CEA doesn't make it easy because it charges customers for the information.

Joe Gombos
Low voltage designer
JBA Consulting Engineers

LEO VISION graphics

Dear editor:

I read the article "Virtual graphics" in *Broadcast Engineering World* July 2007, and I am surprised it did not mention LEO VISION.

LEO VISION pioneered and invented the virtual enhancement in 1990. The company also developed live virtual concepts such as virtual editorial tools and virtual advertising.

Serge Dulin
Virtual imaging department manager
LEO VISION

Test Your Knowledge!

See the Freezeframe question of the month on page 6.

Send answers to editor@broadcastengineering.com

Ikegami's HDK-79EC CMOS Camera:

SHOOT TO THRILL In Any HD Format.

CMOS image sensors are now being incorporated into many of Ikegami's popular broadcast cameras. These include the new HDK-79EC, a multi-format, full digital HDTV camera system, supporting both triax and SMPTE fiber camera cable. CMOS is a "new" technology with many advantages over traditional CCD image sensors, including the ability to create "any flavor" of HDTV image (progressive or interlace) while also achieving superior picture quality, a wide dynamic range, and no vertical smear. Each pixel of the CMOS sensor has its own amplifier so it can perform amplification on a pixel basis. CMOS sensors allow for smaller camera size (with drive, amplification and A/D conversion inside the sensor itself), decreased power consumption, high-speed (fast frame-rate) capabilities, and multi-native format capabilities. CMOS imaging advantages are also available in several other new Ikegami cameras, including the new HDN-X10 EditcamHD, a tapeless HDTV camcorder, and the new HDL-50 multi-format HD box style POV camera.

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What's your excuse?

Broadcasters need to enable the transition to local HD content.

BY CRAIG BIRKMAIER

As the era of analog NTSC broadcasting inches closer to an end, the percentage of U.S. homes with widescreen, HD-capable displays is growing rapidly. In turn, viewers and local video content producers are asking an important question: When will broadcasters begin to produce widescreen and HD programming, and enable independent producers to deliver programming and commercials in the widescreen SD and HD formats supported by the ATSC standard?

If there was any doubt that the era of HD video acquisition had begun, those doubts were erased at NAB2007. A wide range of products, from entry-level camcorders to high-end digital cinematography systems that can acquire images with up to 2000 lines, are now shipping in volume. A high-quality camera head that can shoot in any of the ATSC formats now costs little more than the SD products that are being replaced.

Glass is the only area where HD acquisition is significantly more costly than SD. To gain the full benefits of HD acquisition, you may need to spend nearly as much for the lens as for the camera head. But many lower cost combinations can deliver widescreen images, from high-quality SD to full-quality HD. The one point of commonality is the ability to acquire and display widescreen images.

Unfortunately, while the number of channels that offer HD content is increasing — especially those delivered by multichannel subscription systems — the vast majority of commercials are still delivered in the SD 4:3 aspect ratio.

This should be a red flag to broadcasters and any nonbroadcast network that delivers HD programming. The industry is already concerned because consumers have the power to zap commercials. They can pick up the remote and surf during commercial breaks, or with a DVR they can fast-forward through the commercials. So why disrupt the continuity between widescreen program content and the commercials that help pay for it by switching to the 4:3 aspect ratio during commercial breaks?

When will broadcasters begin to produce widescreen and HD programming?

Discovery Communications, which includes the flagship Discovery Channel and Discovery HD Theater, recently announced the results of a study of HD advertising effectiveness that it conducted with Starcom USA. (See "Web links" on page 16.) The study concluded that "commercials in high definition not only look better, they sell better." The study found that the increase in brand recall by HD viewers was triple that of SD viewers. Intent-to-purchase was 55 percent higher when ads were seen in HD as opposed to SD.

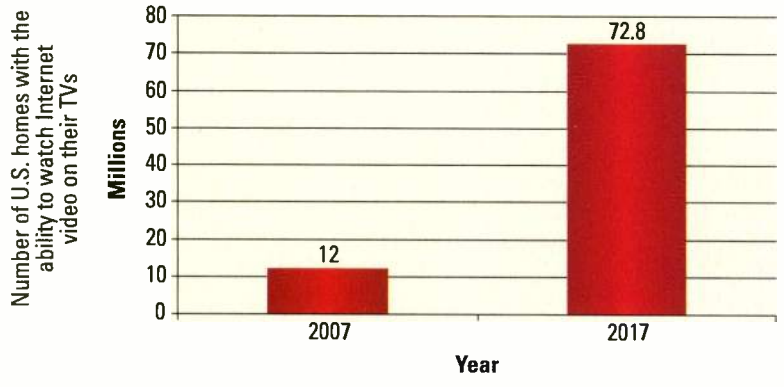
Are viewers more likely to watch commercials when they don't see the switch from widescreen to NTSC pillarbox on their new widescreen displays?

Another study by the Home Technology Monitor found that HD viewers are no more likely to watch TV commercials than SD viewers. (See "Web links" on page 16.) The study says HD subscribers find commercials produced in HD "more relevant," but 88 percent of HD viewers say they change channels or ignore

FRAME GRAB *A look at the issues driving today's technology*

In 2007, 12 million homes could watch Internet video on TV

By 2017, that figure will increase to 72.8 million homes



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Both the DP600 and DP600-C can be used for a range of invaluable applications. Discover how the Dolby DP600 Program Optimizer can save you time and money. **Visit our website, and click the DP600 spotlight for additional information.**

www.dolby.com

DP600 and DP600-C applications include:

- Broadcast media file QC and loudness correction
- Broadcast media file transcoding
- Automated digital program insertion (DPI)
- VOD file analysis and loudness correction

The DP600 Program Optimizer is now shipping.

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Digital Lighthouse, an independent production company in Gainesville, FL, is shooting HD for a range of clients, including CBS Sports. This shoot will be part of a traveling exhibit produced by the Florida Museum of Natural History.

the commercial when it comes on, as compared with 80 percent of non-HD viewers.

Format wars

The transition to digital broadcasting has enabled manufacturers to break away from the historic practice of developing proprietary formats that all deliver the same NTSC composite video signals. Unfortunately, this pattern is repeating itself as we move to the common language of bits.

Web links

- Discovery finds HD ads pay off
  www.tvweek.com/news/2007/09/discovery_finds_hidef_ads_pay.php
- Home Technology Monitor study: How people use HDTV
  www.knowledgenetworks.com/htm/index.html

The ATSC standard offers broadcasters a menu of formats that can be tailored to programming requirements, with options for spatial resolution and frame rates. The common ground is that all formats are encoded using MPEG-2 compression and delivered using the MPEG transport stream specification. Every consumer receiver must decode and present all of these formats at the native display resolution.

But broadcasters have elected to use only a subset of these formats, with local stations typically building their physical plants around the HD formats used by the networks they are affiliated with. In the end, all of the HD formats are being converted to either 1080i with 59.94fps or 720p with 59.94fps, while SD is always 480i with 59.94fps. One of the major reasons for this is to maintain continuity between program content and commercials so that receivers do not need to change scanning characteristics as the formats change.

One would think that maintaining aspect ratio continuity would be equally important, yet widescreen ads are rarely seen, even on dedicated HD cable networks like ESPN HD. Thanks to affordable entry-level HD camcorders, some stations are beginning to migrate their local newscasts to HD, but local HD commercial production is virtually nonexistent.

It is now becoming quite common for independent producers to shoot their projects in HD, even if the final output will be 4:3 SD. Those with HD acquisition gear may also be able to shoot projects for the networks — especially local interviews used in HD sporting events.

As was the case with NTSC, however, the ability to get this kind of work is highly dependent on the ability to supply the networks with the final work product in the physical format they require. Ironically, tape-based HD formats are typically what the networks are looking for.

The delivery of projects on P2 memory cards or HDCAM Blu-ray discs is virtually unheard of, as is the use of hard drives and DVD discs. The ability to upload files via high-speed networks is generally not supported, despite the fact that consumers are now routinely downloading HD programming via the Internet.

The solution seems obvious. It's time to create the infrastructure for the delivery of MPEG-2 files using DVD-R or high-speed networks. A DVD-R can hold more than 30 minutes of MPEG-2 HD content encoded at 25Mb/s. Even at 40Mb/s to 50Mb/s, rates often used to deliver contribution-quality network programming to affiliates, a DVD could hold an entire rotation of HD commercials or short program segments.

Don't wait!

With little more than a year until the scheduled February 2009 end of NTSC broadcasting, it is time for broadcasters to develop a comprehensive strategy to support widescreen SD/HD programming and commercials.

A good place to start would be to deliver all widescreen programming to NTSC viewers in letterbox format. If commercials delivered to HD viewers in pillarbox is a red flag for commercial breaks, perhaps delivering all NTSC programming in letterbox would be a red flag for consumers to buy a widescreen display. It might also encourage advertisers to get with the program, so to speak.

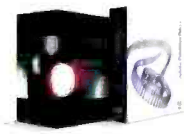
To help speed the conversion to widescreen SD/HD, broadcasters need to work with manufacturers to develop standards for the delivery of MPEG-2 files in any of the ATSC formats. If there is still any doubt, it is time for broadcasters to start shooting and delivering widescreen content. BE

Craig Birkmaier is a technology consultant at Pcube Labs, and he hosts and moderates the OpenDTV forum.

? Send questions and comments to: craig.birkmaier@penton.com

Blackmagicdesign

Multibridge Pro has HD-SDI and analog editing with HDMI monitoring for only $1,595



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Dual Use – Converter and Capture Card

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Multibridge Pro

US$1,595

The Drawn Together images are courtesy of Comedy Partners.

Learn more today at www.blackmagic-design.com

DTV resolution

New FCC proposals seek to increase consumer understanding of the DTV transition.

BY HARRY C. MARTIN

With less than a year-and-a-half before the end of analog TV broadcasting (except for Class A, LPTV and TV translators), the FCC continues to issue orders dealing with the imminent transition and with the related white-space interference issue.

DTV public education

The FCC has solicited comment on several proposals intended to increase consumer understanding of the benefits of the DTV transition. Among the suggestions are mandatory public service announcements and the use of scrolls that impart information about the transition. The FCC is even considering the imposition of reporting requirements, enforced through civil penalties, concerning stations' pubic information efforts.

Final DTV table

The commission adopted the final DTV table of allotments, which lists the specific technical parameters (channel, location, power and tower height) for each authorized full-power TV station. In adopting the table, the commission approved changes to technical parameters for specific stations in order to resolve lingering discrepancies applicable to their allotments. Also, the commission sought further comment on a small number of DTV allotment specifications that were either authorized too late to be included in the final DTV table or that involved modifications which, in the FCC's view, required further comment.

Among the suggestions are mandatory public service announcements and the use of scrolls that impart information about the transition.

White-space prototypes rejected

In the TV white-space proceeding, the commission's Office of Engineering and Technology (OET) released an initial evaluation of prototype fixed-location white-space devices.

In 2006, the FCC called for prototype devices so their technical viability could be quantifiably measured by the agency's laboratory facility. OET noted that several of the features touted by the white-space proponents, such as dynamic power control, were not included in the prototypes it received. Therefore, the commission determined that further testing is not appropriate at this time.

The proponents concede that the first prototype devices were defective, but they argue that they should have been given a chance, midstream, to make corrections rather than suffer outright rejection. Presumably, the devices will be redesigned and resubmitted at a future date.

The rejected prototypes were fixed devices. Mobile white-space units, if any pass FCC muster, will be difficult to track and modify if they cause interference to over-the-air television. This is why the TV industry has vehemently opposed the authorization of mobile white-space operations. While wireless industry representatives — with support in Congress — continue to promote mobile white-space deployment, to date no prototypes have been tested or even fabricated.

As the FCC is the expert body that should be evaluating the white-space issue, it — not Congress — should make the decisions. The FCC's recent equipment-related actions could diminish the congressional initiatives that have clouded the white-space picture. BE

Harry C. Martin is a past president of the Federal Communications Bar Association and a member of Fletcher, Heald and Hildreth, PLC.

? Send questions and comments to: harry.martin@penton.com

Dateline

- December 1 is the deadline by which TV stations in Colorado, Minnesota, Montana, North Dakota and South Dakota must file their biennial ownership reports with the FCC.
- December 1 also is the deadline for TV and Class A stations in the following states and territories to place their annual EEO reports in their public files and post them on their Web sites: Alabama, Colorado, Connecticut, Georgia, Maine, Massachusetts, Minnesota, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota and Vermont.

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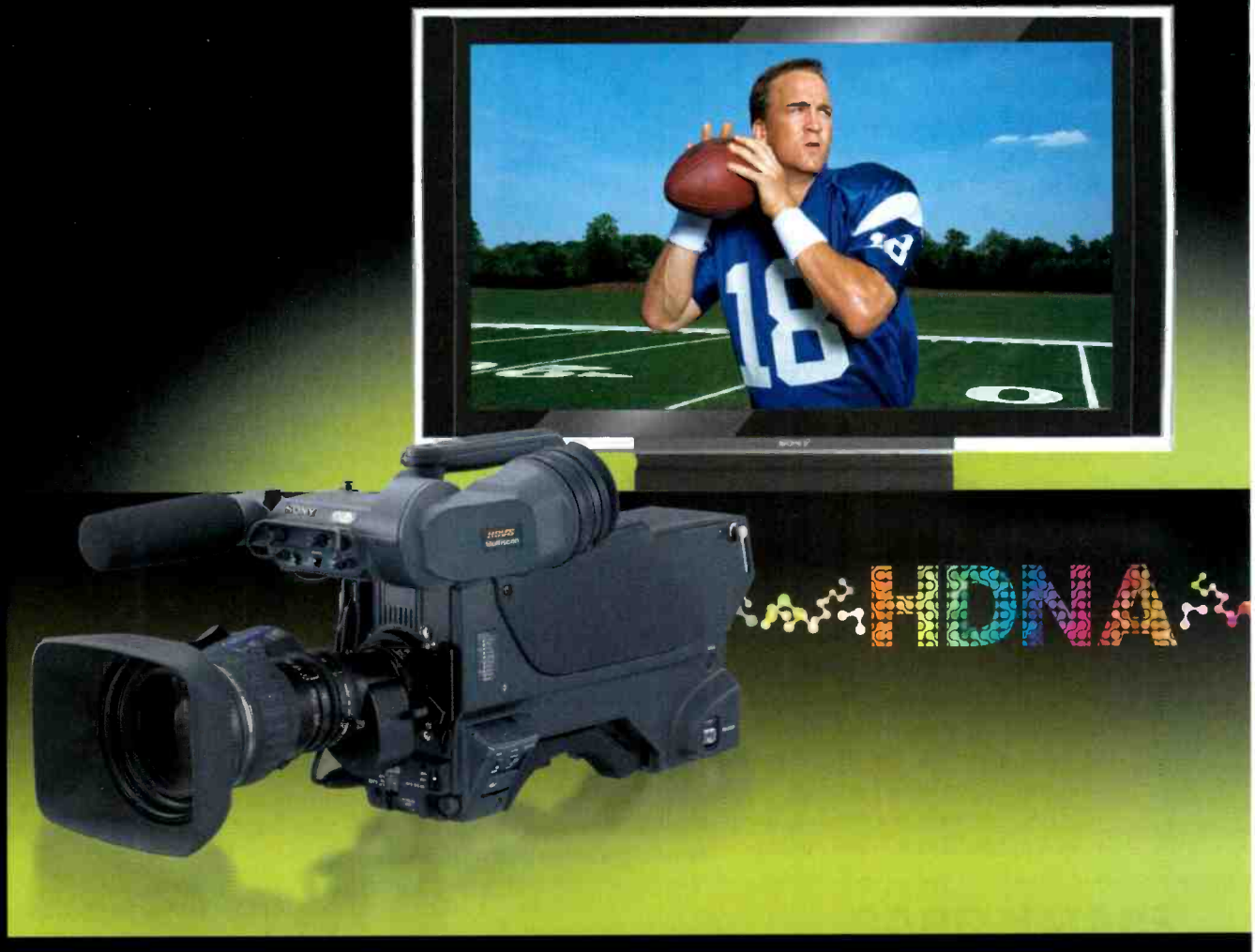

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World TV standards

ATSC, ISDB-T, DVB-T and DTMB stake their claims.

BY ALDO CUGNINI

In the last few decades, there has been a revolution in the technologies used to deliver video and audio to users. Transitioning completely to digital delivery means the hope for a single worldwide standard has given way to several systems due to timing, receiver technology maturity, regional priorities and politics. While the United States and Europe have spearheaded the terrestrial delivery of digital programming, other nations are now following suit.

Design decisions

MPEG-2 has strongly influenced the rollout of video service. (See Table 1.) Starting with ATSC in the United States and a handful of other countries, the video and systems-layers are nearly exclusively delivered using the standard. However, the use of transmission and audio technologies has not converged in a similar fashion. While many of the umbrella standards allow the use of different components (see Table 2 on page 22), exclusivity has become a deciding factor. In a nutshell, ATSC does not support COFDM or MPEG-2 audio, and DVB does not support VSB (or AC-3, in most regions).

Region		Transmission	Transport	Video	Audio
Africa	South Africa	DVB-T	MPEG-2	MPEG-2	MPEG-2
Asia	China	DTMB	MPEG-2	MPEG-2 or AVS-China	MPEG-2 or AVS-China
Asia	India	DVB-T	MPEG-2	MPEG-2	MPEG-2
Asia	Japan	ISDB-T	MPEG-2	MPEG-2	MPEG-2/AAC
Asia	Russia	DVB-T	MPEG-2	MPEG-2	MPEG-2
Asia	South Korea	ATSC	MPEG-2	MPEG-2	AC-3
Australia		DVB-T	MPEG-2	MPEG-2	MPEG-2, AC-3
Europe		DVB-T	MPEG-2	MPEG-2	MPEG-2
North America	Canada	ATSC	MPEG-2	MPEG-2	AC-3
North America	Mexico	ATSC	MPEG-2	MPEG-2	AC-3
North America	United States	ATSC	MPEG-2	MPEG-2	AC-3
South America	Argentina	ATSC	MPEG-2	MPEG-2	AC-3
South America	Brazil	ISDB-T	MPEG-2	MPEG-2	MPEG-2/AAC
South America	Honduras	ATSC	MPEG-2	MPEG-2	AC-3

Table 1. Terrestrial digital standards

At this point in time, many of the standards have been officially decided, but deployment is still to come. Note also that while the governments of Argentina and Brazil have decided independently which digital TV standard each nation would deploy, they have also agreed to work together to implement a single standard for the Mercosur customs union.

ATSC

The overriding design goals of the ATSC system were to replicate the coverage of analog NTSC terrestrial television using rooftop antennas

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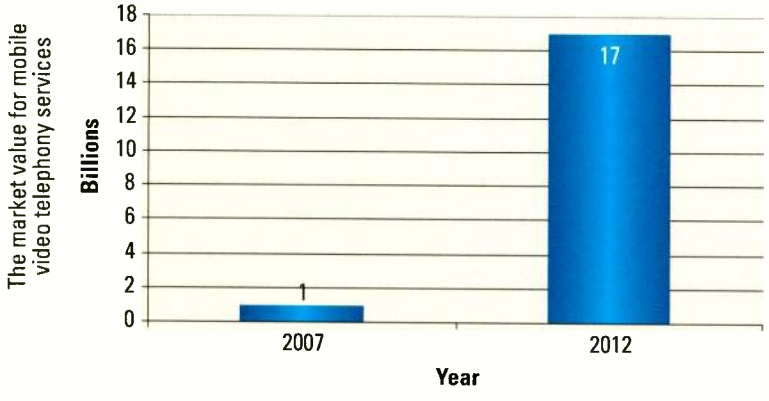

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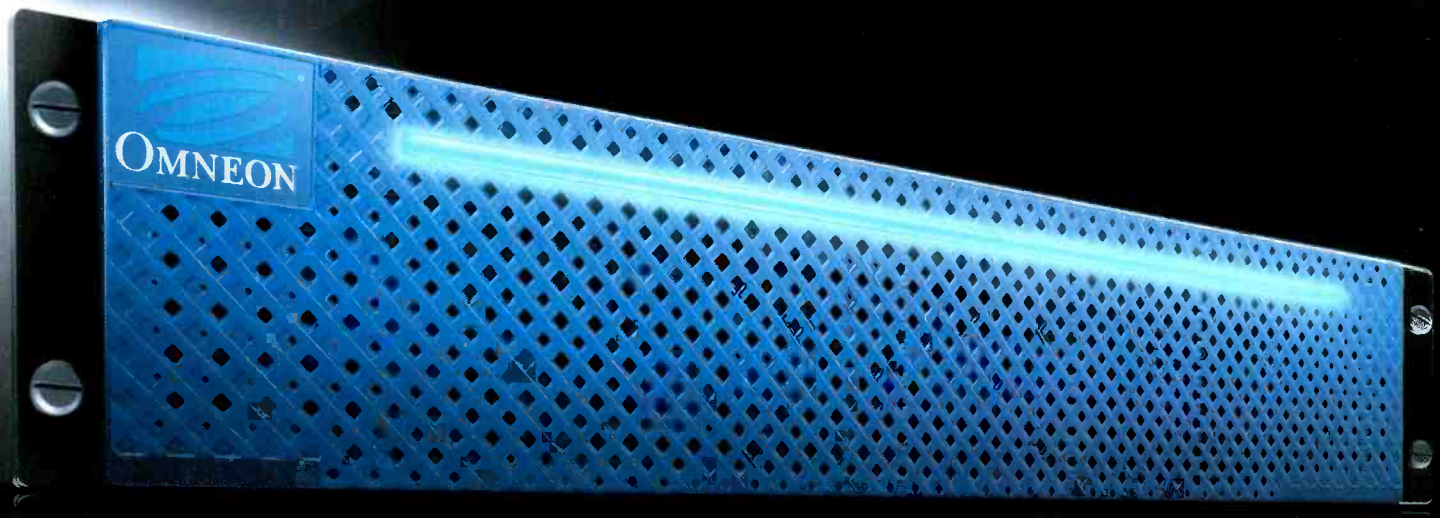

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System	ATSC	DVB-T	ISDB-T	DTMB
Proposing region	United States	Europe	Japan	China
Transmission	Single carrier	Multiple carrier (OFDM)		Single carrier (QAM)/Multiple carrier (OFDM)
Bandwidth	6MHz/7MHz/8MHz	6MHz/7MHz/8MHz		8MHz
Modulation	8-VSB	QPSK/16-QAM/64-QAM	DQPSK/QPSK/16-QAM/64-QAM	4-QAM/16-QAM/32-QAM/64-QAM
Error correction	Trellis code + RS	Convolution code + RS		BCH code + LDPC code
Characteristic	Distributed-transmission capability	SFN capability	SFN capability, segmented OFDM, time interleaving	Time interleaving, frequency interleaving

Table 2. The different standards have varying constituent elements, allowing local customization.

and to provide the capacity for digital HDTV broadcasting. As is well known to most of our readers, ATSC uses 8-VSB modulation with a fixed level of error correction. While incorporating the MPEG-2 systems and video standards, ATSC has several constraints to those standards, including limiting transmission to packetized elementary streams (PES), and specifying the various video profiles and levels that are supported.

ATSC has recently begun work on ATSC-M/H, expected to provide mobile and handheld transmission modes compatible with ATSC A/53. To date, two ATSC-compatible systems have been demonstrated for mobile and handheld use: A-VSB from Samsung and Rohde & Schwarz, and MPH by LG and Harris. These and several other systems have now been formally proposed to ATSC.

The ATSC Synchronization Standard for Distributed Transmission, A/110a, defines a standard method for synchronization of multiple transmitters using 8-VSB modulation. The standard describes the mechanisms necessary to transmit synchronization signals to several transmitters, including the formatting of associated packets. It also provides for adjustment of transmitter timing and other characteristics through additional information carried in the specified packet structure, as well as techniques for cascading transmitters in networks of synchronous translators. Two types of single frequency networks (SFNs) are defined: digital on-channel repeaters (a daisy-chain network) and distributed transmission (a star network).

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DVB-T

DVB-T is the Digital Video Broadcasting standard developed for terrestrial television. Mandated for use in the European Union, the standard has also been widely adopted elsewhere. Based on MPEG video and systems, and coded orthogonal frequency-division multiplexing (COFDM) transmission, the DVB standards also define cable and satellite transmission. (The latter two media in the United States also use similar, though proprietary, standards.)

COFDM is a way of coding the data stream onto a large number of individual carriers. With DVB-T, various transmission parameters can be selected, allowing the individual broadcaster to trade off parameters such as data rate, signal robustness and multipath.

DVB supports two modes for OFDM transmission: 2K (1705 carrier) and 8K (6817 carrier), with QAM carriers. While the 8K mode can allow more multipath protection, the 2K mode offers advantages for moving receivers. Five code rates are supported, from 1/2 to 7/8. The code rate 1/2 has the highest redundancy, but the highest transmission safety. A code rate of 7/8, on the other hand, has a low redundancy but a very weak error protection. Three types of nondifferential modulation schemes can be selected: QPSK, 16-QAM and 64-QAM, offering 2, 4 or 6 bits per modulation symbol, respectively.

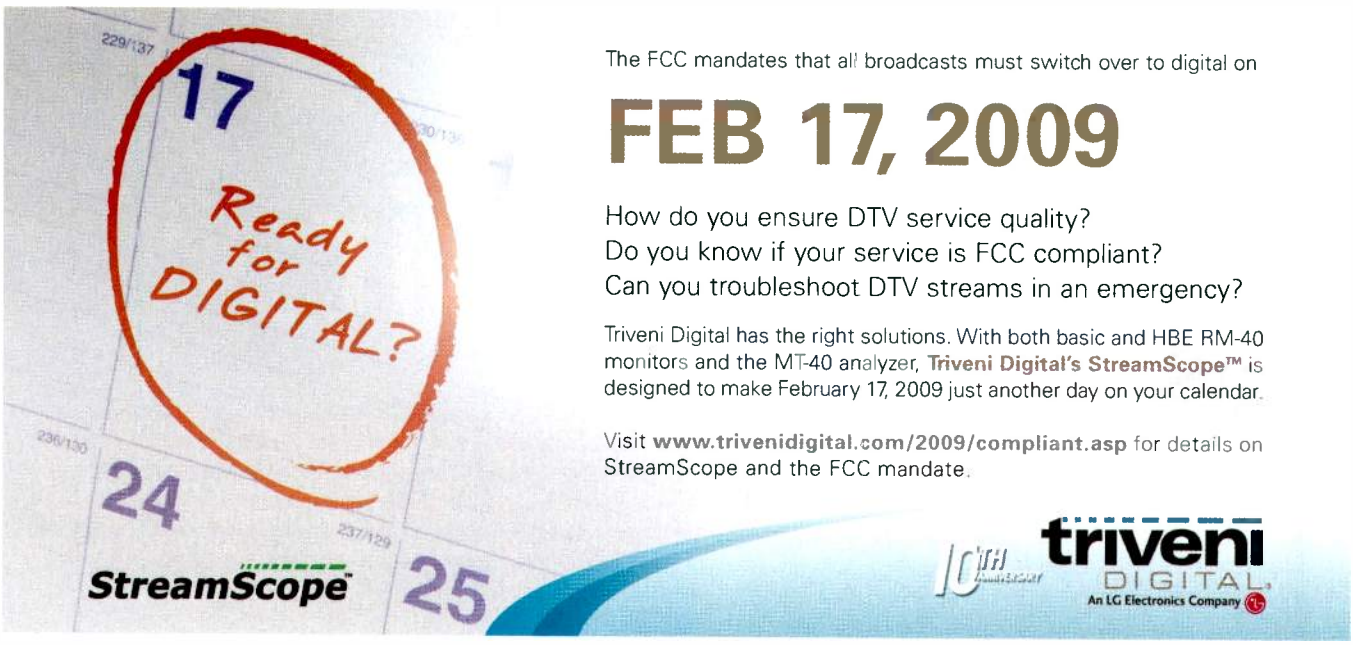
A guard interval that protects against multipath is inserted between consecutive COFDM symbols. This immunity must be traded off with data rate, as the length of the interval affects the net data rate. Various guard intervals are available — from 1/4 to 1/32 — depending on the amount of multipath immunity desired. SFNs — where multiple transmitters operate on the same carrier frequency — can also be set up, by proper choice of the guard interval.

DVB-T also includes hierarchical modulation, where the data to be transmitted can be split into two parts: one at a lower data rate with high error protection, and a second with higher data rates and weaker error protection. In this manner, SDTV and HDTV could be sent simultaneously with different coverage characteristics.

In order to support the multiple transmission characteristics that could change dynamically in some deployments, DVB also defines a Transmission Parameter Signaling for automatic receiver compatibility. Manual selection of modulation parameters at the receiver is also possible.

A guard interval that protects against multipath is inserted between consecutive COFDM symbols.

In Australia, several features of DVB are used in a unique combination. While television services transmitted in SDTV require an MPEG-1 Layer II audio stream, the service may also contain a Dolby Digital (AC-3) audio stream. For an HDTV transmission, however, either Dolby Digital or MPEG-1 audio is allowed. In addition, the requirement of analog and digital simulcasting, together with a minimum annual HDTV programming requirement, has led to a so-called triplecast scenario.



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ISDB-T

ISDB-T, standardized in Japan by ARIB, was developed after ATSC and DVB, and hence has several newer features. Band-segmented transmission-OFDM (BST-OFDM) can provide simultaneous services for HDTV and mobile and portable reception by dividing a 6MHz channel into 13 segments for signal transmission.

For example, a mobile reception service that employs one segment can be partially received, together with HDTV broadcasting on the other 12 segments. Three SDTV services could likewise occupy 12 segments. Similarly, a separate digital terrestrial sound broadcasting service can use a one- or three-segment scheme. In this manner, a common one-segment receiver can receive both TV and sound broadcasting services.

Also, an HDTV mobile reception mode was developed using reception direction-control techniques and Doppler-shift compensation techniques. Using this mode, stable HDTV reception has been demonstrated at speeds of 100km/h (62mph).

While DVB has a separate standard for handheld and mobile applications (DVB-H), ISDB-T has a handheld mode as a subset of the standard (as does ATSC). By using one segment in the center of the 13 segments, the handheld service has a capacity of 312Kb/s, using QPSK modulation. MPEG-4/AVC is the supported video codec for this mode.

DTMB

The Chinese government has developed a proprietary system, now called DTMB, for Digital Terrestrial Multimedia Broadcasting. Incorporating MPEG-2 systems with video coding provisionally similar to MPEG-4/AVC, the transmission scheme features a layered frame structure synchronized with real time, a function developed for power saving. Single-carrier and multicarrier operation are possible, and four-level through 64-level QAM are supported.

A one-segment receiver can receive both TV and sound broadcasting services.

Switchoff

The analog broadcasting switchoff varies by implementing country. Berlin-Brandenburg became the first region in the world to switch off its terrestrial analog signals in August 2003. In December 2006, the Netherlands was the first country to do so. In the United States, the analog switchoff is slated for February 2009, and while there has been some noise about possible delays, the push to free spectrum for "first responders" and emergency uses — together with pending spectrum auctions and the Federally mandated converter box program — most assuredly freezes that date. The switchoff of Japanese analog broadcasting — mandated by the Radio Law — is scheduled for 2011.

Conclusion

The variation in world digital TV standards is, for the most part, one of transmission system, with scanning formats now of lesser consequence, especially with the profusion of digital signal processing. While the promise of a universal TV system may have to await future developments, the display and storage of video have come closer to a ubiquitous norm. BE

Aldo Cugnini is a consultant in the digital television industry.

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Video-over-IP challenges

Transporting video over packetized networks produces high-quality results if you understand the network.

BY BRAD GILMER

Last month's column covered some of the fundamentals of sending real-time video over packetized networks. This month, I will discuss the challenges designers overcame in building video-over-IP transport systems.

Private network vs. public Internet

To better understand the challenges faced in video-over-IP transmission, it's important to know the nature of the network over which the video will be transmitted. One of the most critical questions is whether the video is being sent over a private network or a public network. (See Figure 1.)

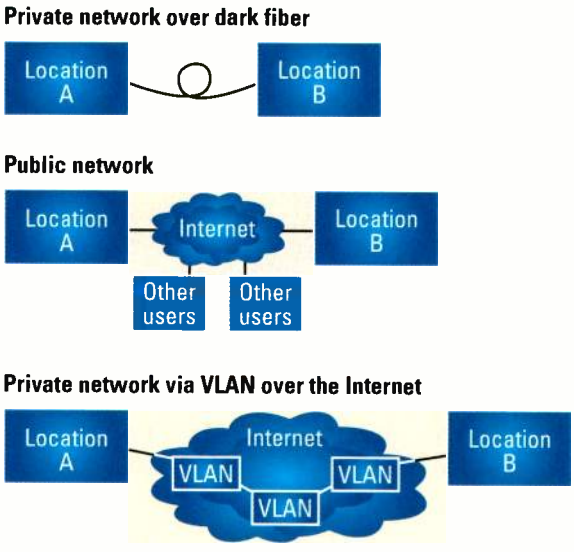

Figure 1. Examples of a private network, a public network and a VLAN over the Internet

Private network

In a private network, traffic is controlled by the user. Traffic is not mixed with traffic from other users, and the user knows how bandwidth is allocated in that network. In some cases, the private network is built from dark fiber, and the only traffic that flows on the network is the user's video. This is an ideal case. More frequently, video traffic is combined with data and voice traffic, even if this is the user's own network built on dark fiber, usually added by your company's IT department.

From a practical standpoint, the IT and telecom guys will want to transport their signals to your dark fiber link. This can help justify the cost of the circuit. If the user mixes different types of traffic over the same fiber, however, adequate traffic engineering must be done on the network to ensure that the video gets through undisturbed.

Local area network vs. wide area network

When considering private networks, it is helpful to understand that in the video transport community, the concept of a private network does not extend into a facility. In other words, someone in the video transport business will probably not think of your internal local area network (LAN) as a private network. This does not mean that you cannot transport video on the LAN within your facility — quite the contrary. In the interest of having good communications with your vendors, you should be aware that the term private network almost always refers to a network outside of your facility.

A wide area network (WAN) covers a large geographical area. It may connect two locations or hundreds of thousands of locations. So a private network is a type of WAN, but not all WANs are private networks.

While we are getting some terminology straight, I should point out that if you start talking to a networking person about your private network, he might think you are referring to a special kind of LAN that uses the private IP address space. (Examples of private IP addresses are 192.168.1.12 and 10.0.0.20.) This has nothing to do with private WAN networks built to carry video over IP.

Public Internet

The public Internet is a type of WAN, and it has become the ubiquitous communications medium of our time. While video over the Internet has improved, it is unlikely that any major broadcaster is going to rely on it alone to carry the backhaul of a major sporting event. The buffer requirements for Internet video transmission are large, resulting in unacceptable delay. Even with these large buffers, disturbances still occur.

Given these issues, that means that the Internet is out for broadcast use except in the most drastic situations where other transmission options are

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not available, right? Yes and no. The Internet by itself would be a challenging transmission medium for professional video-over-IP applications, but in many cases, the Internet does allow for the transport of video over IP using virtual LAN (VLAN) technology.

In carefully controlled environments where all the routing components are known, VLANs can be configured to provide private transport of data over a public network. If dark fiber is not an option, then your next best bet may be VLAN.

Loss profile

Sometimes it can be confusing talking with service providers and manufacturers. There are a lot of options out there, including whether to have a private or public network, and whether or not to use the Internet with or without VLANs. But in many cases, the discussion boils down to the loss profile of the network and the ability of the user or network provider to control that loss. In short, the IP loss ratio (IPLR), or the ratio of delivered packets to lost packets, differs greatly depending on the transmission technology employed. For example, a typical Internet connection may experience an IPLR of $1x10^{-3}$, while the loss ratio on a private network on dark fiber can approach $1x10^{-14}$ or more (smaller numbers indicate less loss on the network).

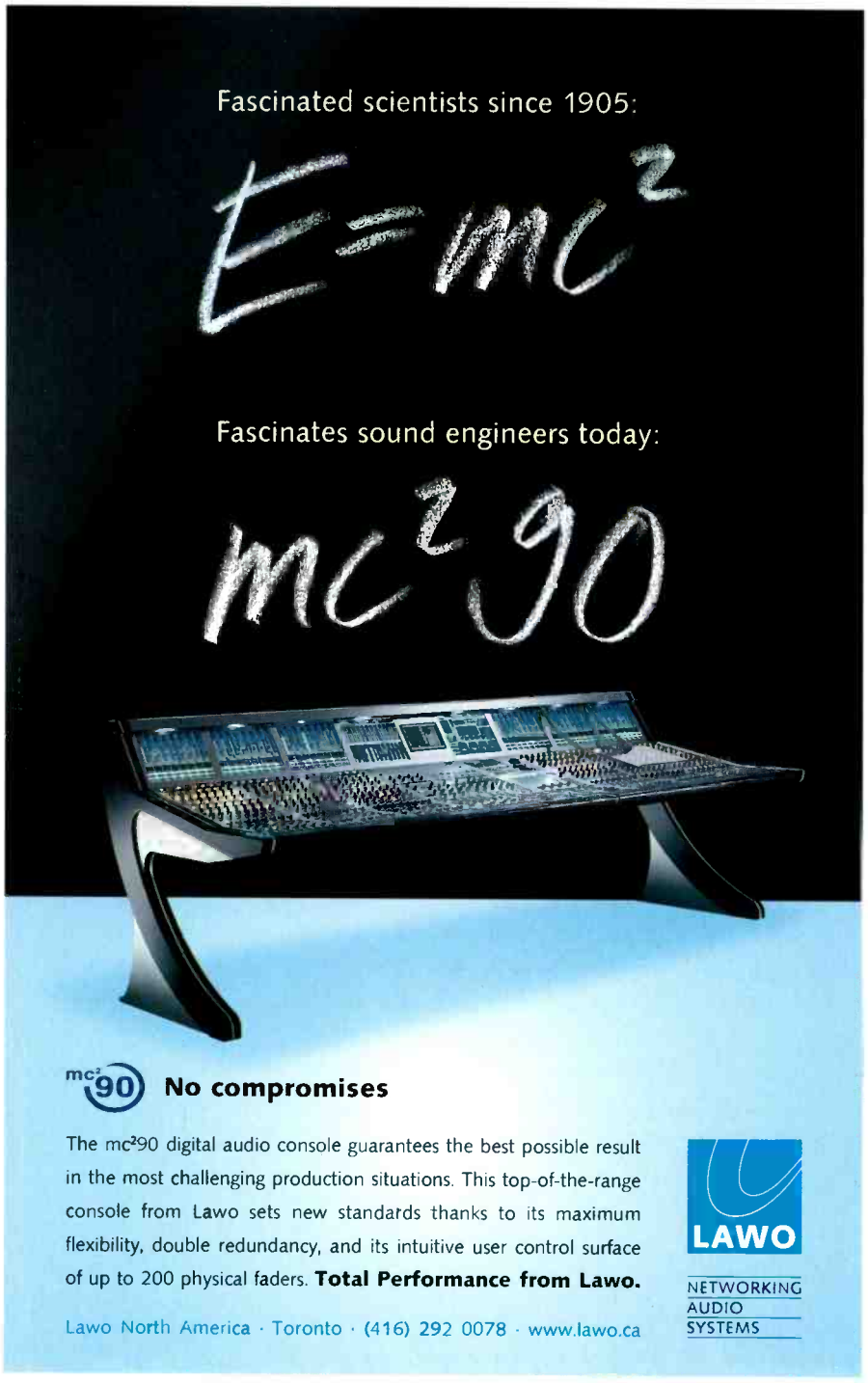
Many events you watch on television today have been transported over packetized networks.

It's important to know how prone your networks are to error, but more information is needed if you want to prevent those errors. It is one thing to design a system to recover for random errors that happen occasionally and in no particular order. It is another thing to design for errors that occur infrequently and last for several seconds at a time.

Transport providers and equipment manufacturers have invested a lot of time collecting data so that they can create loss profiles. These loss profiles are mathematical descriptions of the likelihood of any particular kind of losses and the distribution of those losses. Once engineers understand the nature of the errors, they can design systems to correct for those errors. Clearly the loss profile of the Internet is vastly different from the loss profile of a dark fiber point-to-point circuit.

Challenges in video-over-IP transmission

As you can imagine, there are challenges in delivering streaming video



over IP networks. One challenge is interoperability.

If you're designing a system that transports video over IP within a single company from one point to another, then interoperability is a nonissue. You decide on the video standards, compression standards, forward error correction (FEC) method and Internet standards.

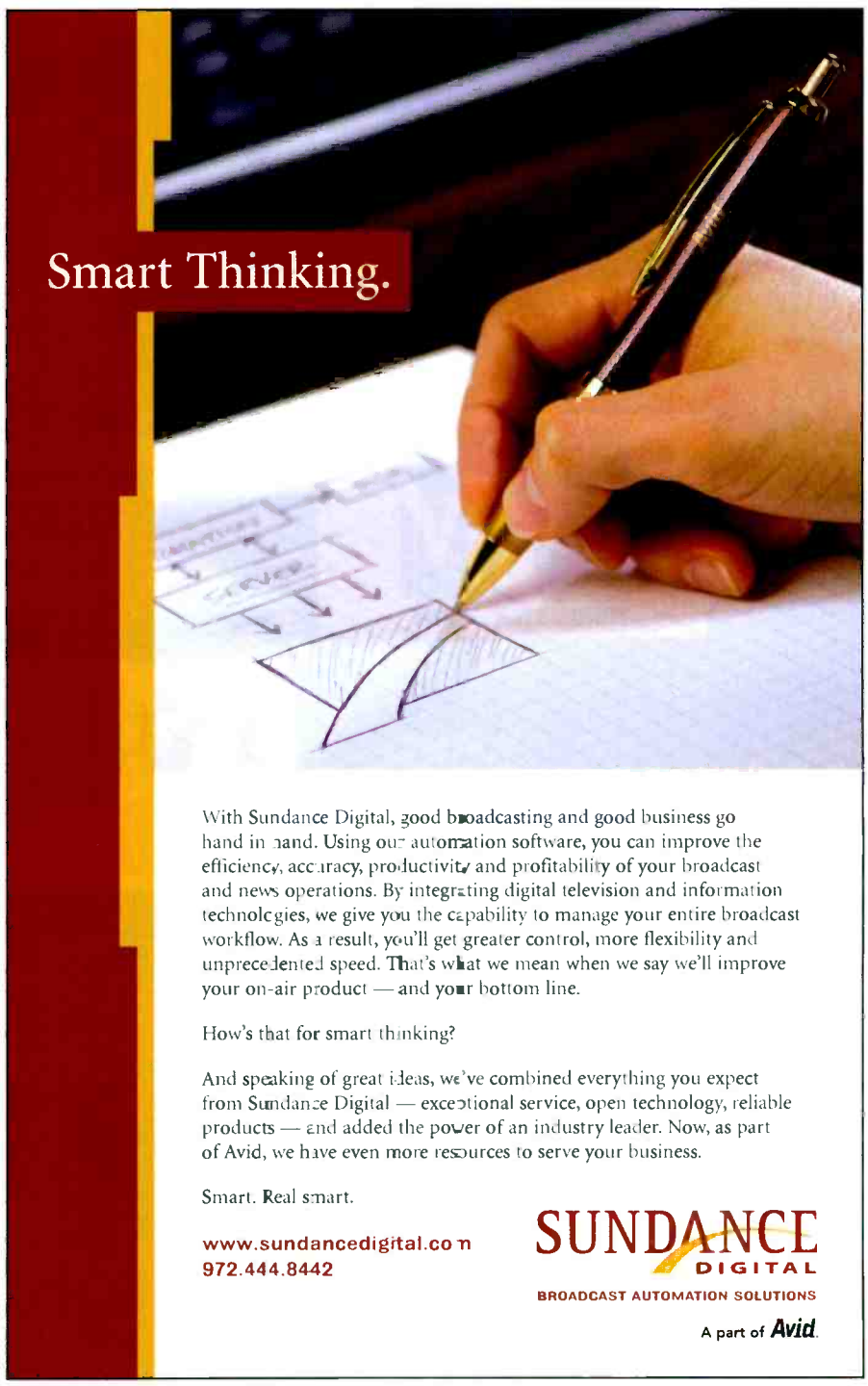
On the other hand, if you are working with a system that transports video between different entities, or even within different branches of the same entity that use different corporate standards, then you may face some challenges. Of course, the issue of interoperability is not new for broadcast engineers, but video over IP adds a few new parameters:

- *Video standards.* If you are sending a type of video that is not supported by the receiving equipment, then obviously the system will not work.
- *Compression standards.* As with video standards, it's not a good idea to use incompatible compression standards between the sender and the receiver. Feeding MPEG-4 into an MPEG-2 decoder will not achieve acceptable results. Achieving interoperability across different MPEG-2 systems — while much better than in the past — may occasionally cause problems. If you are building one of these systems, be sure to test compatibility between differing encoder and decoder combinations.
- *FEC standards.* Recently, SMPTE produced a standard (SMPTE 2022) for the use of FEC over packetized networks. The DVB has also done some work in describing FEC methods. It is important to use standardized FEC if you want to ensure that error correction capabilities function correctly when interoperating between different equipment manufacturers.
- *Internet standards.* SMPTE 2022 describes a standardized way of mapping MPEG-2 transport streams onto IP. Of course, if the sender and receiver use different IP transmission schemes, then interoperability issues will result.

Overall, the good news is that standards exist to resolve these interoperability issues. Manufacturers and service providers are working together to ensure that video-over-IP installations go smoothly. Many events you watch on television today have been transported over packetized networks, so if someone approaches you about transporting video using packetized networks, you should know that it can be done with high-quality results. BE

Brad Gilmer is president of Gilmer & Associates, executive director of the Advanced Media Workflow Association and executive director of the Video Services Forum.

? Send questions and comments to: brad.gilmer@penton.com



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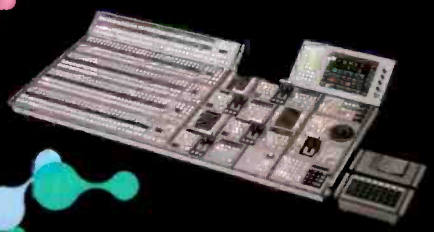

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News economics

When moving to an integrated nonlinear, server-based news system, also consider HD.

BY MARK HORTON

Each of the key players in a news operation can benefit from a move toward an integrated news environment. It's worth looking at each key player's point of view in detail and determining the available choices.

General managers' view

Successful broadcasters understand the big picture as well as the details. The news station must be a viable business. Financial performance ratios are commonly used tools to judge the health of a business. The primary ratio is return on capital employed, often expressed as earnings before interest and tax divided by total capital employed.

This ratio allows general managers to relate operating profit to the capital invested in the organization. In a news company with old, paid off — and therefore depreciated — equipment, some ratios can appear good. However, the real picture is more complex.

In old-style tape-based news, the anchor journalists are key to the channel branding. Craft editors are also important because their skill and speed on complex systems make the seemingly impossible happen.

A key question for any organization is: "Are we getting the most out of our people and systems, especially the expensive ones?"

Two other ratios are especially useful here:

1. Direct labor divided by sales; and
2. Production overheads divided by sales.

General managers run stations as businesses. They want a return on capital, the assets to be fully utilized and value of the business to increase.

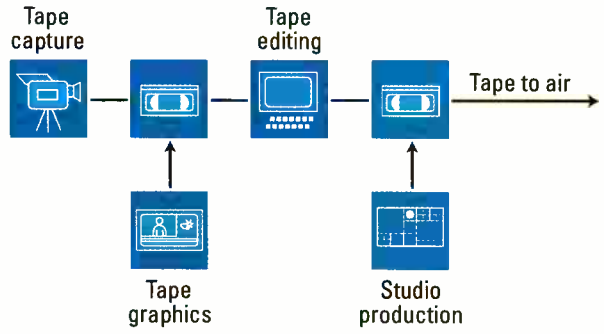

Figure 1. Traditional tape-based news packaging is a multigeneration, sequential, linear, step-by-step workflow.

A common business school maxim is that momentum to change one area is often helpful in changing another. This is a maxim that should be adopted by bold management, and HD can be a part of the change process.

News directors' view

News directors want to get compelling stories out to the audience ahead of rivals. They want staff to produce great stories, with no technical hassle.

In the recent past, crews shot on tape, and stories were edited on tape and played out to the transmitter from tape. (See Figure 1.) That all worked fine until rivals started to use disc-based editing systems, potentially beating others to the punch.

Your viewers expect to learn about major events almost as soon as they occur.

However, many early nonlinear systems were piecemeal solutions, so the benefits of a truly integrated newsroom weren't really delivered.

Now, your viewers expect to learn about major events almost as soon as they occur. They might be at home, at work or traveling. Your viewers also have access to the Internet and wireless devices capable of receiving text, sound and video wherever they may be. They're no longer satisfied with watching a journalis read a written report. They expect to see and hear from correspondents at the scene. They want to see the events for themselves — live, if possible.

That's why news directors need technology designed to provide a fast to air, cost-effective storytelling environment with HD built in as standard.

Journalists' and editors' view

While some broadcasters want to keep journalists in their traditional role, increasingly others want journalists to edit, telling stories with pictures and sounds, not just with words. Many journalists also want to make this change.

Today all material needs to be available to any designated user as it is ingested. Journalists, craft editors and designers need to work concurrently on shots or stories, massively

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The user interface needs to scale from straightforward browse stations to fully featured craft editing systems so there is a common workflow for users and a common language between applications. (See Figure 2.)

Engineering directors' view

Before making a major new technology change, wise engineering directors will carefully consider the present technical infrastructure and working practices. Most days have predictable peaks and downtimes but big, unexpected events can hit anytime. A lot of people and expensive equipment can be required to cover these demands in conventional tape workflows.

Engineering directors then take a hard look at real requirements:

- Typically most stories are simply shots cut from source footage. You don't necessarily need highly trained linear editors to do that. Journalists, producers and in some cases cameramen are quite capable of doing the work — and basic storytelling mostly needs only basic editing.
- It's efficient for graphics artists and craft editors to share effects and graphics footage concurrently. Simple graphics can be made on a graphics workstation with a predesigned template. Highly skilled craft editors and designers are better used adding value to special reports, designing better templates and improving the station's look.
- The people who write the headlines, intros, traffic reports, recaps and teases are capable of selecting shots themselves, given the right level of tools.

With this in mind, it's now time to think about technology that will fit the business needs.

Engineering directors are charged with implementing the tape-to-server transition smoothly. That's no small task. The enabling technology must work reliably, be easy to use and train on, and be future-proofed as much as possible. The solution must meet those requirements, both today in SD and tomorrow in HD.

There must also be a concern for what legacy technology will remain and how it will interface. Engineering directors understand where the cost efficiencies in the transition lie, such as maintenance of legacy equipment, cost of tape stock and VTR head replacement.

Workflow is of paramount importance as the whole idea of the transition is to enhance capability, as well as creativity. Metadata must travel with the clips, and that means down to the single frame.

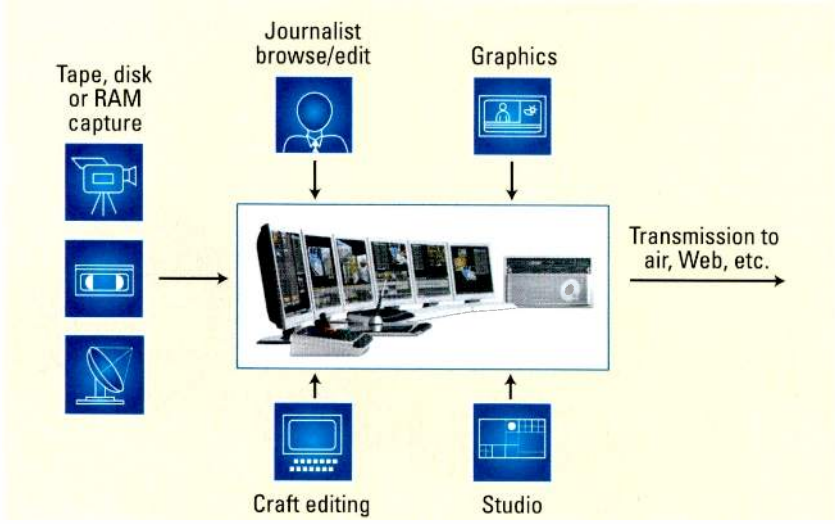

Figure 2. Modern news packaging requires an efficient, collaborative shared workflow, assisted by using such systems as Quantel's Newsbox HD.

How technology choices affect the business model

Some might get the impression that all disc-based news technologies are the same. Not so. There are major differences between systems, and these differences affect the business model.

A few broadcasters might consider buying prosumer PC- or Mac-based systems. This can provide some with a solution that fits their application and has a financial appeal because it's inexpensive at time of purchase. By using only standard IT technology, the individual components appear to be relatively inexpensive, and the choice of components appears wide.

However, there are hidden costs associated with using prosumer technology that can negate any apparent savings related to the original purchase. Poor integration can mean poor workflow and higher staff overhead. Stories can take longer than expected to get to air and may be difficult to re-version. Highly complex media management means bloated disc arrays. With HD, these problems would be even greater.

Of course, there are systems on the market that can work at HD resolution, but these can be costly either at time of purchase or during a later upgrades. In many cases, these offerings don't scale easily, even at SD resolution.

Some of these offerings are actually multivendor, meaning the company that provides them has implemented a number of solutions together to create a workflow. Different user interfaces, code bases and architectures can mean hidden operational and engineering costs. Sometimes, three different servers are required to ingest, edit and play out, which adds to the cost and operational complexity.

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The need for an integrated server architecture

To publish a breaking news story on the air you first need to ingest the material, cut the story and add any graphics and effects. Then play out to air. This process is illustrated in Figure 3.

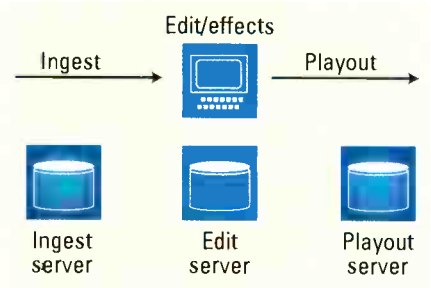


Figure 3. Some server architectures use three devices for ingest, edit and playout.

While some manufacturers use this multiserver solution, an HD upgrade can be expensive. In fact, some systems have to use two edit servers just to provide protection in case of a lost disc.

Day to day, that all means making, managing and moving unnecessary media. In the long term, an upgrade could completely break the original amortization schedule and pricing model.

The need to manage material efficiently

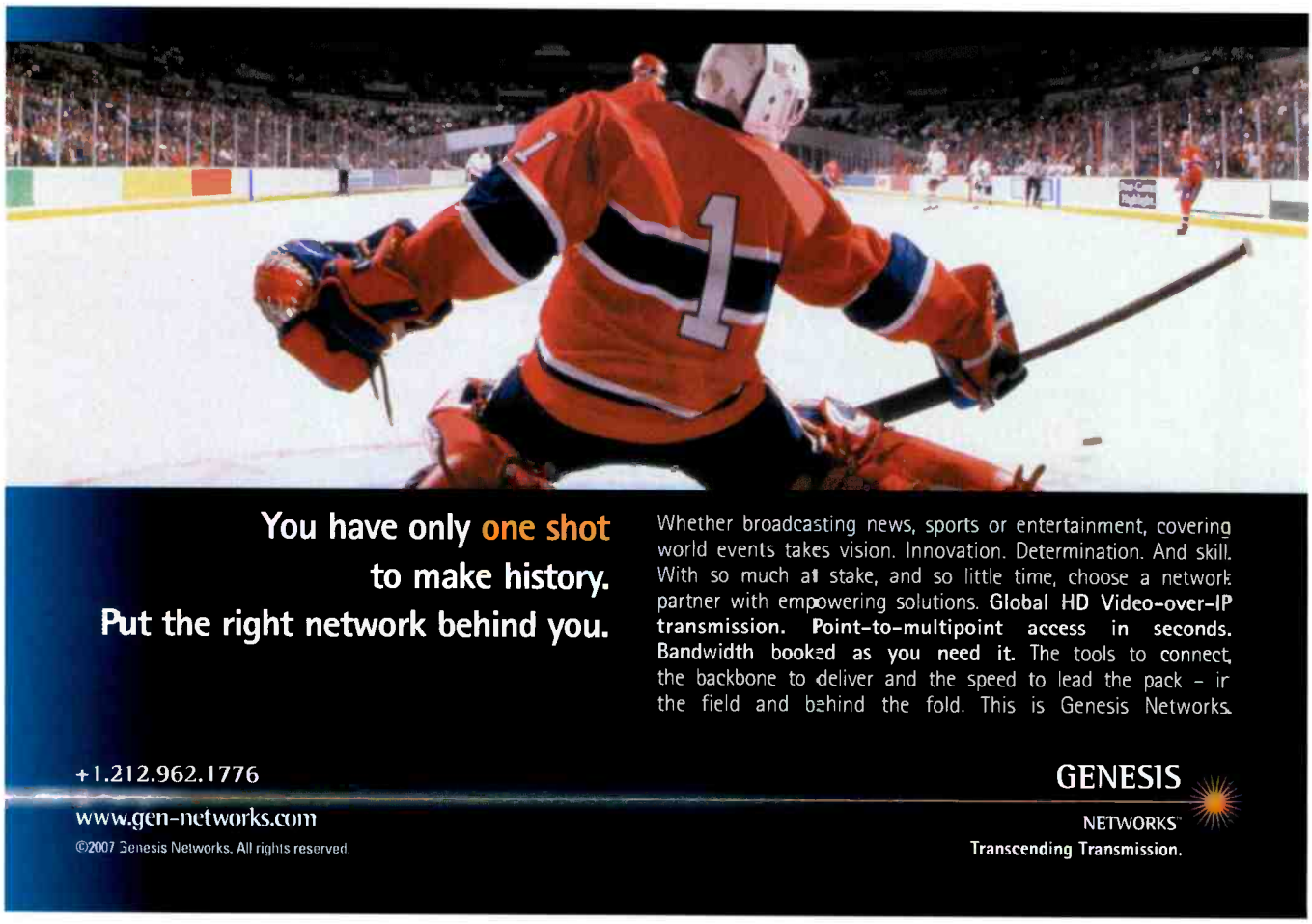
Finally, once broadcasters make the transition from tape to disc, they will need to rethink how to manage stories. Suppose you want to delete one or many legacy stories, and these stories contain shots you want to keep.

Some solutions allow you to delete the old clip, but at the same time you end up destroying the specific shots you want to keep. Other systems won't allow you to delete the old clip (keeping the disk unnecessarily full), so there is a constant need to defragment and consolidate the disks. When working at HD resolution, this problem is amplified because there is so much more data. The workflow can suffer greatly in this scenario.

Summary

The business advantages of moving to truly integrated nonlinear, server-based news creation are clear, and when you do, it makes sense to consider HD. The world is changing fast, and for broadcasters everywhere, HD future-proofing makes sound commercial sense. However, keep in mind that any new technology choice must support both the current and possible future business models. BE

Mark Horton is strategic marketing manager for post and broadcast at Quantel.



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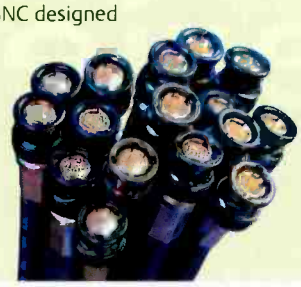

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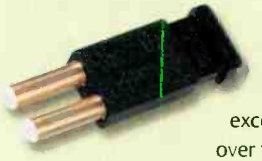

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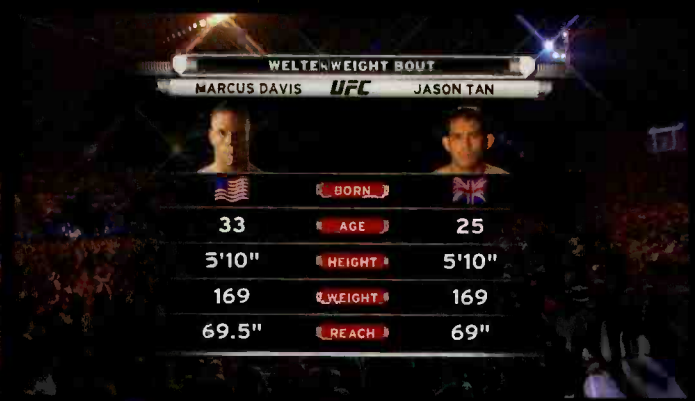

The Ultimate Fighting Championship (UFC) is one of the fastest growing sports in the world, combining the beauty of martial arts with the raw power of boxing, wrestling and kickboxing. Twenty times a year, fans attend UFC events to experience the intensity up close and personal. A worldwide fan base watches the action via pay-per-view and free broadcast television. Ensuring those fans feel as close to the action as possible is a concern that constantly drives us forward in terms of innovation and quality. That's why this year we made the leap from simply producing the events in HD to distributing them in HD as well.

The goal: HD distribution

In June 2003 we began producing all UFC events in HD. However, because of bandwidth limitations, we were restricted to distributing those productions in SD. We wanted to distribute in HD so that we could bring the full beauty of HD images to our home viewing audience.

We reached that goal in February 2007. Of course, more bandwidth on the distributor side helped, but the key enabling technology was the Avid DNxHD 145 codec, coupled with the company's Media Composer

Photo: UFC graphics are animated from an Avid Deko 3000 hybrid HD/SD system. The system displays fighter stats over live footage of the event. The system also creates lower third graphics and displays them over live video of the fighters.

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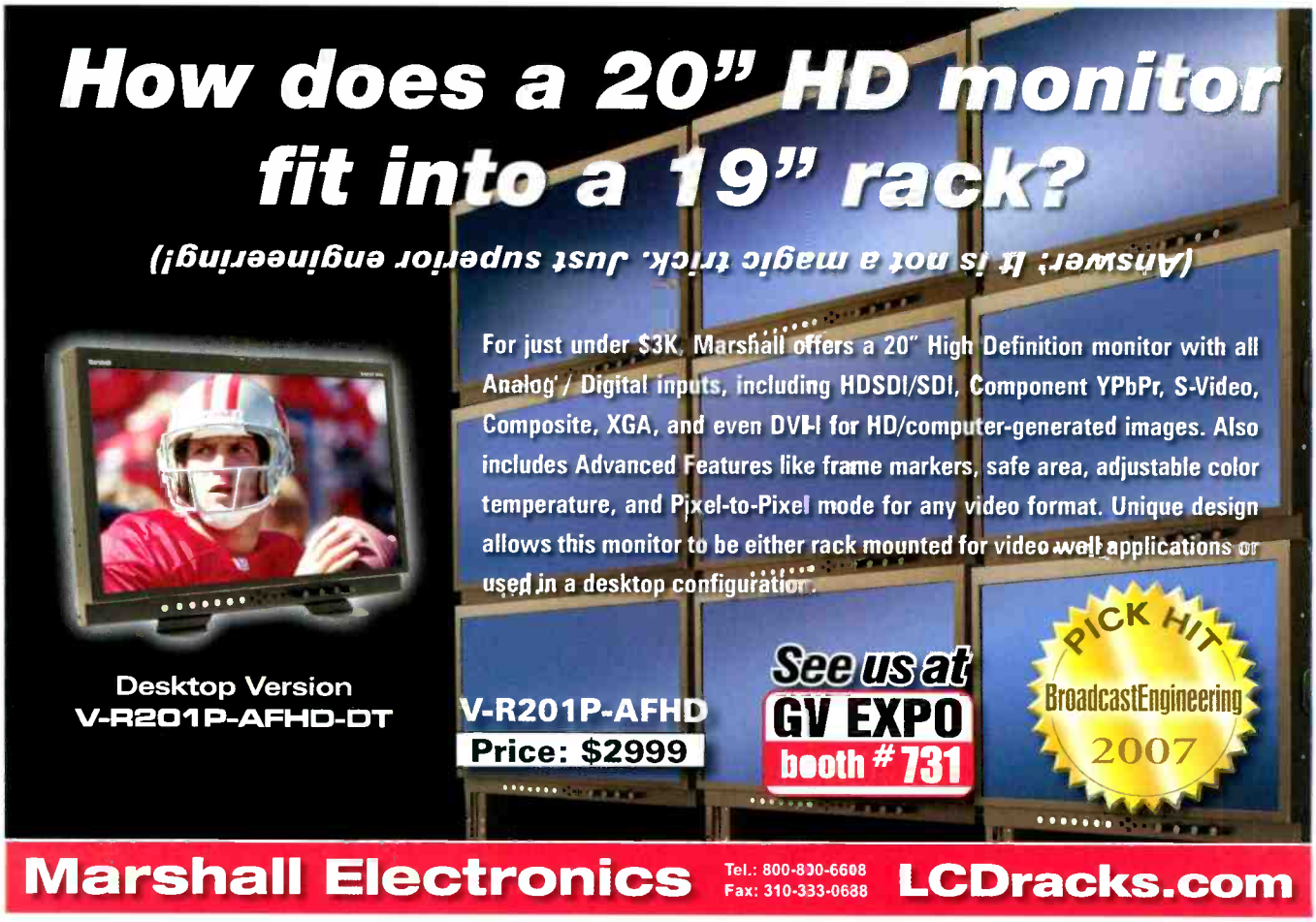
Editor Anthony Petosa works on a UFC feature with an Avid Media Composer Adrenaline in Manchester, England.

Adrenaline systems. This setup allows us the ability to work efficiently in HD and provide viewers with the ultimate in broadcast quality. In addition, the production team appreciates the space-saving advantages for long-term storage provided by the DNxHD codec. (We also duplicate every tape and store them in a secure, off-site facility for long-term needs.)

Coordinating dual HD/SD operation

When we first began discussing a move to HD, our goals were clear: to replicate the SD workflows we use for the skillfully orchestrated TV production. Unlike wrestling, there is no fake drama; the action is real. UFC productions require a great deal of coordination. Video and audio elements need to be preproduced; high-end graphics and effects need to support multiple video formats and standards; lighting



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and staging must be set up properly; and, of course, flawless capture of the live event is crucial. Finally, there is the additional need to store the content for reuse on the Web, other original TV programs and home video.

Avid delivered a one-two technology punch that has helped us make the move to HD without leaving the SD audience behind. We now rely on a nonlinear editing department that is completely based on Avid systems and a 32TB Unity MediaNetwork shared-storage system. We also have two Mac-based Media Composer Adrenaline editing systems, six Media Composer software applications, two Mojo SDI hardware accelerators, and a Deko 3000 hybrid on-air graphics system.

A strength of the systems is their ability for dual, simultaneous HD and SD operation. For example, the Deko can handle files created in both a 4:3 SD window and a 16:9 canvas flawlessly. That's particularly useful when creating an SD file with Adobe After Effects and then using it for the HD telecast. By simply telling the Deko the program is in HD, the SD image is ready to go.

Preproduction elements

Each UFC event begins with putting together scripted feature segments, clip reels and interviews with the fighters. Curtis Edge, editing director for UFC's parent company Zuffa, begins working on each three-hour pay-per-view production in his Las Vegas-based editing suites.

An assistant editor and freelancer prep pretaped elements using Media Composer Adrenaline systems in the primary editing suite, and two workstations equipped with Media Composer software and Mojo SDI hardware in a secondary edit suite. These elements include fighter clip reels, historic event footage and prevoiced features to fill in graphics templates.

Those systems tie into the Unity MediaNetwork, where show templates are accessed and additional pretaped elements are assembled. Material stored on the Unity system is also easily reused in other programming, including in teasers, on venue projection screens or on the UFC Web site.

While Edge and his team work on the video elements, UFC graphics designer Howard Zryb and his team assemble multilayered graphical information bars that are placed over the live action. PhotoShop files are placed into the Deko system, where Zryb integrates them with text, background video clips, fighter stats and bio information, and other elements.

The hybrid system's interoperability with third-party products makes our jobs a lot easier. The ability to

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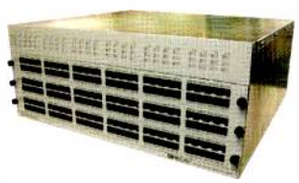

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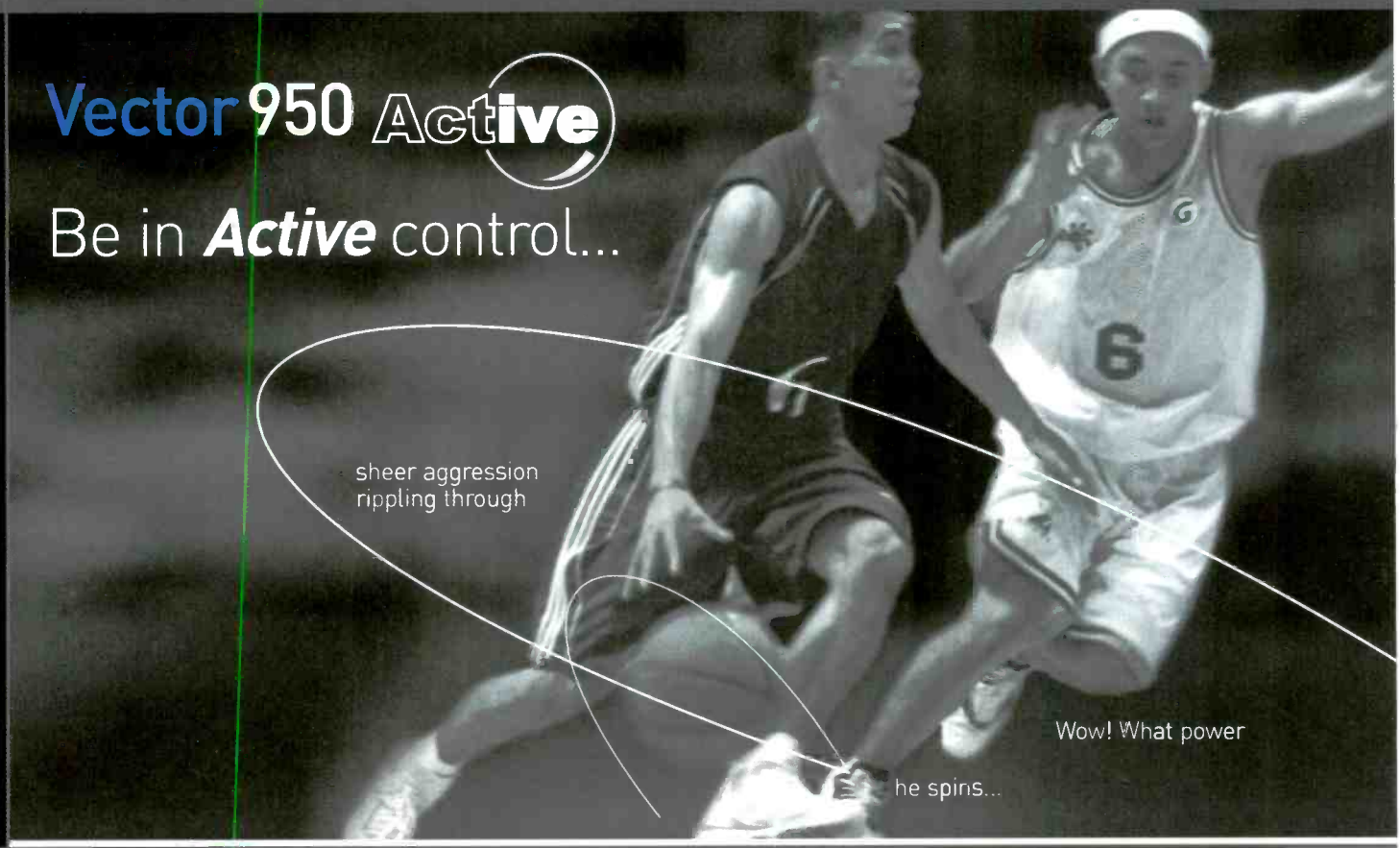

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The combination of Vinten's **Vector 950 *Active*** and Canon's Shift-IS stabilization is ideally suited for use in sports broadcast and other production.

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Editing director Curtis Edge works on an Avid Media Composer Adrenaline system in a UFC on-site editing facility.

work with Adobe, for example, lets us read complex files natively, which is important in maintaining the highest level of image quality possible. In addition, the system's ability to read information from Microsoft Excel means that a fighter's name, weight and age can be imported automatically. Along with saving time, this feature also greatly cuts back on embarrassing input errors making it to air.

Once pre-assembly of elements is completed, the editing team exports the media to a Digidesign Pro Tools system and adds sound effects to the template. A music mix and voice-overs are also laid down. Audio producer Mike Sak, owner of Kill the Messenger studio, does all of the sound design with Pro Tools. Those completed elements are then loaded into an EVS XT2 server for playback during the live event.

Even after loading the completed elements onto the server, the Media Composer systems' work is not done. A copy of all show packages is transferred to the editing workstations for last-minute editing on the day of the fights. Depending on the show, we will rent as many as five additional Media Composer Adrenaline systems to use in the live broadcast edit facility to handle the workload.

Here again, the third-party integration is a key benefit. At any point during a live match, a producer can call for any of the files to be played out from the server. The editing systems then allow for elements to be dropped into those prerecorded segments to make them appear as if

At any point during a live match, a producer can call for any of the files to be played out from the server.

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Graphics designer Howard Zryb uses the Deko 3000 to call up premade graphics templates during a live UFC event.

they are live.

We can also input and output in both HD and SD formats simultaneously. Not having to input and create content twice introduces time and cost savings because it doesn't require a second staff. In addition, it allows us to serve SD viewers in an even better way because the image quality from HD ensures the SD image is as great as it can be. Using 4:3 center cutting of the action, we can deliver perfect HD and SD content.

In the ring

When it comes to capturing the action on fight night, directors switch between as many as 11 Sony and Ikegami HD cameras, eight of which may be recording at a time.

By show time, our staff has grown from approximately 15 in preproduction to 80 strong. Our facility company, Concom, which is based in Bloomfield, CT, subcontracts the mobile production needs to Game Creek, ensuring we have top-quality vehicles on-site.

During the actual event, the seamless interoperability between the Media Composer Adrenaline systems and the portable Media Composer software stations allows for anyone involved in the content creation — whether they're sitting in the live truck, the secondary edit suites, or in the new media department where the Web site content is managed — to edit in HD. This is a big plus for an event and production team that is always on the move.

The video and audio are clearly important parts of the broadcast product, but without quality SD and HD graphics, our broadcasts would only tell half the story. Graphics are an essential storytelling device for sports programming. For a sport like UFC, where some of the competitors are not widely known, the ability to provide background information via graphics is a necessity.

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The Deko 3000 hybrid system is operated in the production truck and provides up-to-the-minute, fact-based scrolls and lower thirds packaged with dynamic, eye-catching graphics. This setup enables Zryb to enter new text as needed to capture the live results in real time.

Deko's motion effect features are a production team favorite, allowing Zryb to add visual impact to text by animating it with such graphics as flares, lightning bolts and flashes. Edge, in fact, says that the system is as important as the cameras because it is actually on-air from the very beginning of the broadcast to the end credits. It keeps working until the last credits roll. The files are then stored in the Unity system for use on future shows.

Deko's motion effects allow Zryb to add visual impact to text by animating it with graphics.

To fully optimize media assets, UFC shares its multilayered, pay-per-view footage across departments — and with the producers and editors of those future television shows — using the Unity MediaNetwork shared-storage setup.

In addition, the Unity system allows storage of hours of HD preproduction video and graphics online. If anyone involved in a production needs to find, for example, a shot of a specific fighter executing a specific technique or move, it can be found instantly.

The system also allows us to more easily supply content to Zuffa's new media department. The department uses four workstations loaded with Media Composer software plus one Mojo SDI hardware accelerator to input media for conversion to Web formats with a high degree of portability. With the use of SDI inputs and the right decks, almost any format can be ingested.

The next move will be equipping the Unity MediaNetwork with Unity TransferManager software. This will streamline production even further by transferring preproduced media directly to the server rather than laying it back to tape.

Protecting the UFC brand

The move to HD has been a rapid one for UFC. Two years ago we had one Adrenaline system and Xpress Pro software on a laptop. As our popularity has risen, we've become increasingly protective of our brand. That's why we expanded our Avid solution to a full-blown setup in early 2006, giving us the total creative control we need. BE

Tim O'Toole is director of production for Zuffa, the parent company of the Ultimate Fighting Championship.

Design team

Curtis Edge, editing director
Tim O'Toole, director of production
Mike Sak, audio producer and music supervisor
Howard Zryb, graphics designer

Technology at work

Adobe After Effects software
Avid
- Deko 3000 hybrid HD/SD graphics system
- DNxHD codec
- Media Composer Adrenaline editing solution
- Media Composer software
- Mojo SDI connector
- Unity MediaNetwork storage
- Unity TransferManager software
- Xpress Pro software
- Digidesign Pro Tools audio system

EVS XT2 server
Ikegami HDK-70 cameras
Microsoft Excel software
Sony HDC-1500 HD cameras

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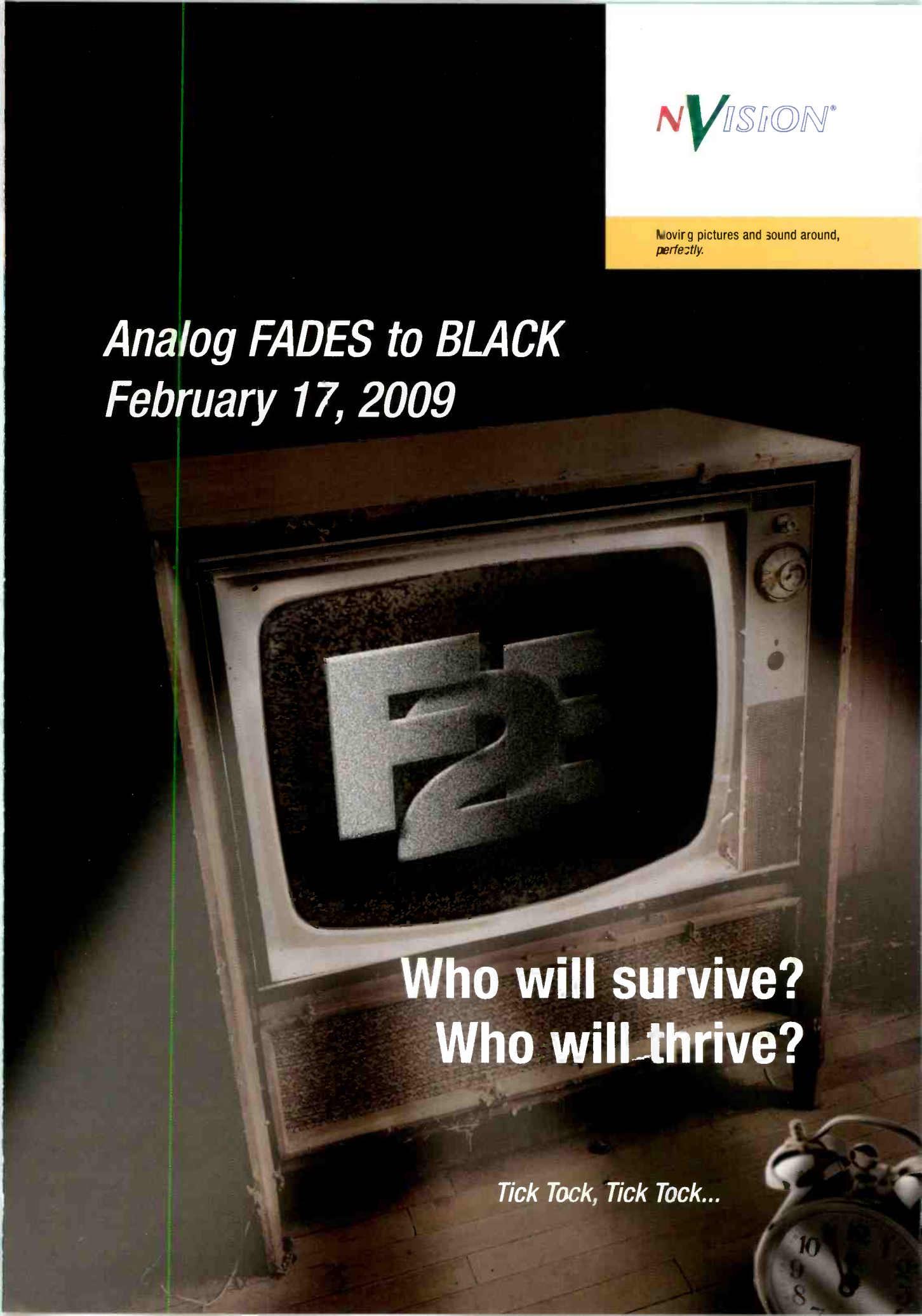
Analog FADES to BLACK
February 17, 2009



Who will survive?
Who will thrive?

Tick Tock, Tick Tock...

Fade to Black
The analog to digit

Five players from across the broadcast industry are battling it out – trying to beat the FCC deadline for conversion from analog to digital delivery. Watch as they maneuver their way around the obstacles and try to improve their positions in a fiercely competitive field.

What will they do next? Who can they trust?

George

Director of Engineering, 15-station TV group

With an ambitious vision gleaming in his head, George convinced corporate management to invest enough capital to "do it right." Will he go power mad, or stay focused on his goals?

George's plan:

- Consolidate operations into 5 regional facilities
- Go all HD, up-converting SD sources to HD, and down-converting HD master control feed to SD as needed
- Engineer for maximum resiliency and redundancy
- Allow for future growth

What NVISION built for George:

- Independent, expandable master control for each station
- Shelf spares ensure fast recovery from any malfunction
- Redundancy options protect all signal paths and provide full router control even if a system controller fails.
- Router expands up to 256x256 with modules, or 512x512 with a second frame.

See the whole package at www.nvision.tv/george

Doris

General Manager, two public TV stations in middle America

She's a 20-year broadcast pro, but no engineer. Now she has to design and spec the right system to convert to digital, yet leverage her legacy in analog. Can she do it on a "charitable" budget?

Doris's plan:

- Replace 15 year-old analog routing system with digital
- Originate one HD program stream in prime time
- Originate four SD streams in daytime
- Unique branding and independent programming for each station

What NVISION built for Doris:

- A cost-effective master control system supporting 2 HD channels and 8 SD channels
- A cost-effective all digital routing system comprised of a 32x16 HD router and a 32x32 SD routing system
- Single cost-effective router control system for both routers

See the whole package at www.nvision.tv/doris

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#1 in future-proofing your investments with scaleable designs

al game is on!

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Dave

Operations and Engineering Manager, independent station, top-50 market

A hands-on workaholic who loves television, Dave has to juggle analog and digital, SD and HD as he converts in small steps. Will "playing it safe" be dangerous for Dave?

Dave's plan:

- Manage substantial syndicated programming in SD while slowly transitioning to HD
- Convert analog signals to digital so he can hang onto some old analog equipment
- Redundancy and reliability are top priorities

What NVISION built for Dave:

- Router accommodates SD and HD sources in one frame
- Future expansion without a "forklift event" by adding second frame
- HD and SD master control in one frame with room to grow
- Compact router for inexpensive routing of analog signals, plus machine control

See the whole package at www.nvision.tv/dave

Bill

Chief Engineer, independently owned station, small market

Doubles as an engineer for AM/FM radio station. Bill expects to go digital and HD on a micro-budget, and without much muss or fuss. Who can he count on to deliver?

Bill's plan:

- Replace a 20 year-old master control switcher
- Switch and brand both HD and SD channels fed from network
- Allow for a future SD channel
- Route a mix of digital and analog inputs/outputs

What NVISION built for Bill:

- Two channels of basic master control plus 96x64 multi-format routing in a single space-saving 8RU frame
- Pure digital system with analog I/O capabilities
- Ability to add a second channel of SD MC by plugging in one module

See the whole package at www.nvision.tv/bill

JW

VP of Engineering, major TV network

He led the network's move to digital and HD. Now his 20 stations must convert to HD, but their needs are so diverse they can't agree on suppliers. JW isn't happy.

JW's plan:

- Find a supplier with scaleable products capable of supporting all 20 stations
- High reliability and redundancy are mandatory
- Supplier must listen, respond and "take care of JW's needs"

What NVISION built for JW:

- Customized equipment packages based on size of station
- Redundancy built into routing and master control
- Highly reliable, scaleable products with room to grow
- Superior customer service and technical support

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- Redundancy in 4RU

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- Future proofed: scaleable, highly configurable system

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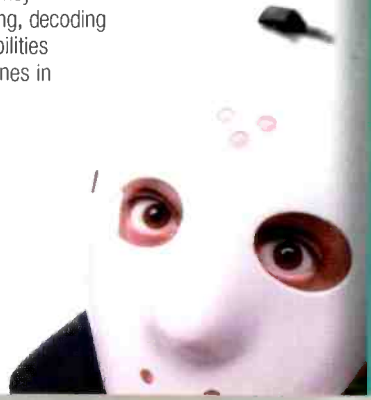

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Transmission lines

With the analog shutoff looming, you need a plan.

BY DON L. MARKLEY

As almost all TV stations have a DTV facility in operation, it is time to plan what moves need to be made in the transmission line on the tower. Should the station plan for major modification, replacement or maintaining the status quo?

Transmission line facilities can be divided into four classes:

- Analog lines that will be abandoned in 2009;
- Analog lines that will become digital lines to the same antenna;
- Digital lines that may have to be upgraded and must be maintained; and
- New digital lines that must meet the final power and channel assignment.

Strictly analog lines

The first class of lines simply needs to be held together until the big changeover occurs. Many of those lines have been in operation for 30-plus years, often with little maintenance.

Replace wristwatch band connectors about every 12 to 14 years. Don't believe manufacturer claims that watch bands never fail. They all fail — sooner or later. Pulse the lines to ensure nothing is in the upcoming failure mode. Remember, the front office is still making most of its money from that old analog system. You'll feel a lot more heat from the front office if the analog line goes down than if the DTV line fails — although that is starting to change.

The problem is keeping the old analog lines working. Duct tape doesn't help in failures, but dual-sided sticky tape might help with broken hangers. There is no need to budget for major projects.

Analog-to-digital lines

For the second class of systems, the care and feeding of the transmission line is a bit more critical. In this case, major projects can be planned and budgeted. The lines are probably old, and maintenance may be questionable. First, sweep and pulse the line to look for developing problems. Plan to replace the watch band if the system is more than 12 years old.

In addition, the entire center conductor run may need replacing. A complete center conductor changeout with connector replacement will essentially provide the station with a new transmission line run, leaving only the big copper pipe with its flanges. This is a good way to upgrade the system at a reasonable cost, especially given the cost of copper.

Maintaining digital lines

Digital lines only need to be maintained until the changeover occurs. This includes stations where the DTV channel will be moved significantly with a major power increase.

Many stations using low- to medium-power antennas have stayed with semiflexible lines for good reason. Often the runs are shorter up to the lighter antennas, all of which will be scrapped. Here the technical staff is lucky. These systems are only about three or four years old. They often are still within factory warranty. Nothing should be required between now and the change date other than keeping them pressurized. Remember, even brand new lines will die if you let them reach atmospheric pressure.

Some lines are capable of operating a DTV channel without maintenance. These lines are fairly new so they should be in good condition. Usually these lines have been swept and pulsed as part of the original installation. The station staff now only needs to maintain good engineering practice. Again, keep the pressure on the lines, or waveguide, as required to maintain a dry status. Watch for any change in the indicated VSWR. The meter on the transmitter can't indicate the line VSWR, as the true condition is only determined by sweep and pulse measurements. But, the transmitter meter is invaluable for spotting a change in reflected power, which in turn indicates that the VSWR is changing at some frequency or group of

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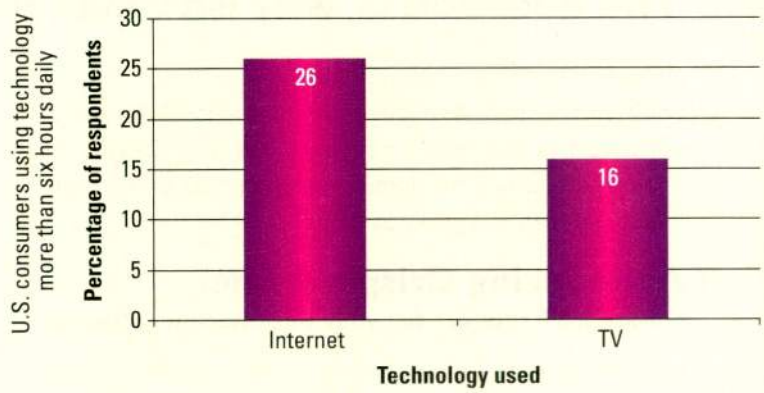
A look at the consumer side of DTV

Internet usage is overtaking TV viewership

26 percent of consumers use the Internet more than six hours daily.



Source: IBM Institute for Business Value

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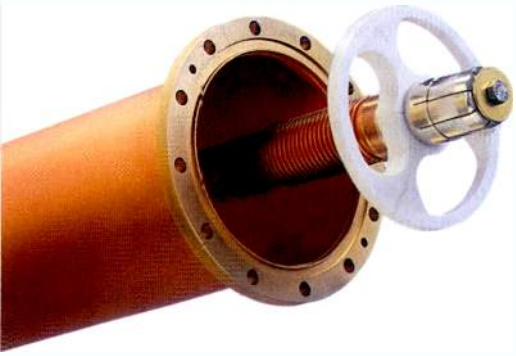
frequencies. At that point, figure out what is wrong and get it fixed before you are off the air.

Establish a regular schedule for testing the line with combiners and filters. The recommended time between such tests varies. Not more than five years should go by without the careful application of a network analyzer to the complete antenna and transmission line system. Add to that a careful examination of the entire system, including the primary power connections, breakers and power distribution wiring, by a good operator with a thermal imaging camera. That test can help you avoid downtime and physical injury to station staff.



The ERI MACXLine rigid line features thermal expansion-compensating bellows.

The cost of such testing is small compared with the cost of repairing a burnout with a day or two of lost commercial time. Some failures cannot be predicted, even with testing. All you can do is to try to catch failures that can be anticipated by careful observation and testing.

New digital lines

The last class of new transmission line systems need to conform to the new power or channel assignment. In short, what worked well on analog works on digital. The DTV signal is robust, the transmitters compensate for limited performance, and the later generations of receivers work well.

All the major manufacturers have complete transmission line products. Depending on the channels involved, other manufacturers can modify their line lengths to avoid the bad reflection problems that would otherwise occur. Of course, on single-frequency systems, that isn't much of a consideration.

Most manufacturers have Web pages that show their range of products. The biggies have hard lines from 7/8in through 9 3/16in, although the upper sizes are not usually needed in the DTV world, with its much lower power levels. They won't reach the higher channel numbers without moding, so they are relatively useless in multiple channel systems. This has led to higher power designs of the smaller sizes. Most hard line sizes are available in 50Ω or 75Ω. Both work well in DTV service. Therefore, the selection goes back to the old criteria of loss, power rating and cost.

Waveguide systems can operate well in DTV service. That includes rectangular, circular and truncated systems. For long runs, the efficiency of such systems can still make them a good choice based on the cost of developing DTV kilowatts.

Use the same method

The major point of the DTV selection process is essentially the same as has been used for years in analog operation. There are still some areas where research is needed to determine how the bit error rate or signal to noise ratios may suffer from mistuning of coaxial lines or waveguide. To date, major problems don't exist. If you select lines the same way as for analog systems, don't anticipate any problems. BE

Don L. Markley is president of D.L. Markley and Associates.

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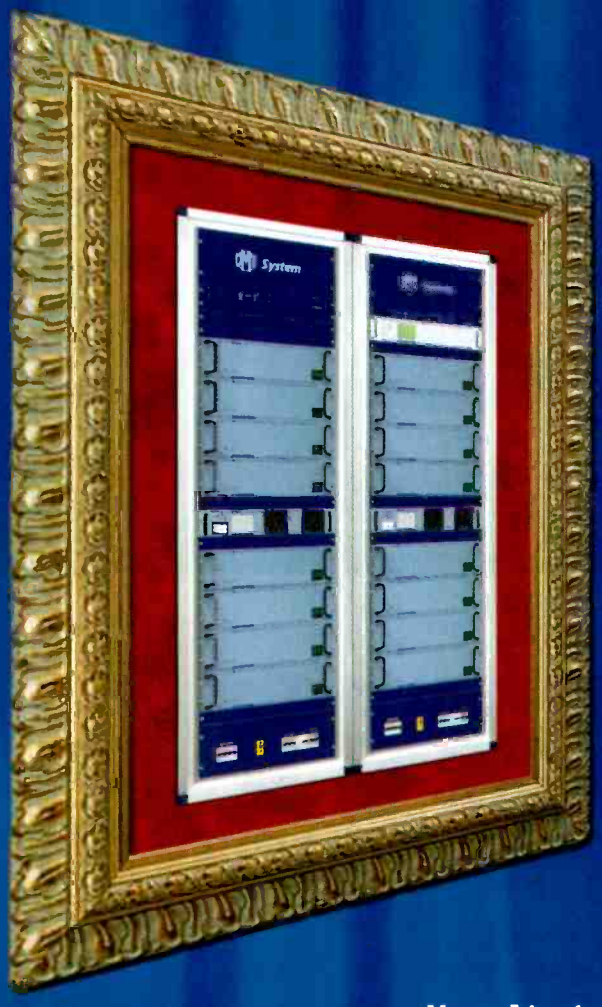

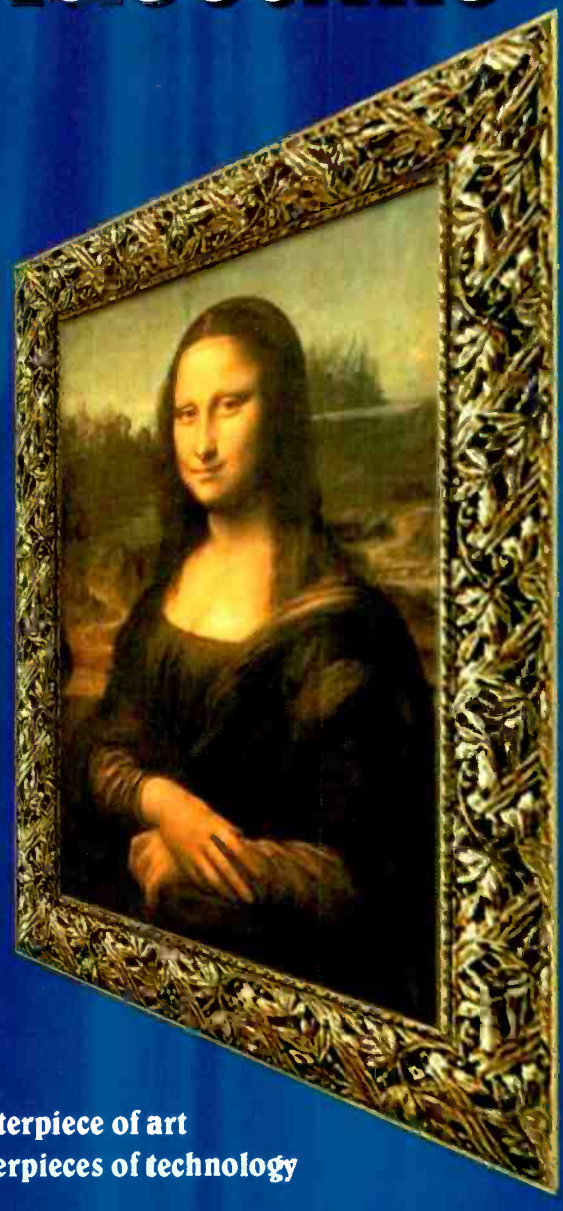

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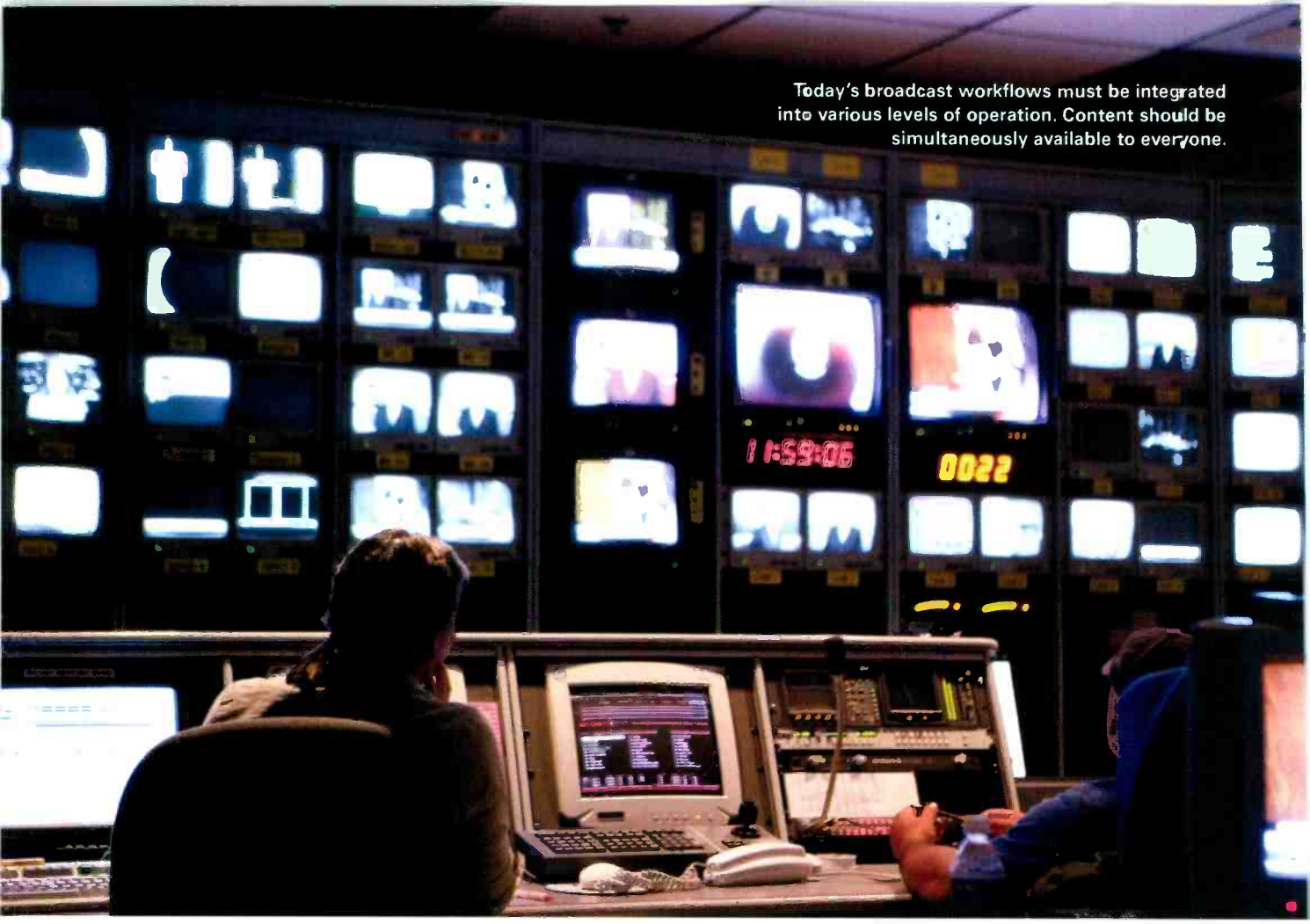

Today's broadcast workflows must be integrated into various levels of operation. Content should be simultaneously available to everyone.

Designing an EFFICIENT NETWORK INFRASTRUCTURE

BY DENNIS M. GLENN

Workflow design has come a long way from the days of the standalone video production system. News outlets of all sizes and post-production facilities demand workflows that are fully integrated into the various levels of operation, making content simultaneously accessible to all stakeholders in a collaborative environment. (See Figure 1 on page 60.) This requires networked digital video systems and effectively managed content, which is not always easy when working with highly sensitive audio and video assets.

The following network infrastructure design goals are fundamental to improving workflow efficiency:

- Minimize downtime through redundancy, no single point of failure and the resiliency to recover quickly from a failure of any part of the network, with minimum impact on production;
- Maximize network throughput and bandwidth;
- Establish architecture for data storage and data path;
- Set a high standard for information security;
- Tie in all aspects of workflow from ingest to playout;
- Allow for the movement of content in any direction;
- Enable work in various video formats and resolutions;
- Improve tracking and management of audio and video assets;
- Facilitate executive review and approval of content in real time via the network;
- Enable craft editors to access and work with different parts of a project, such as graphics, title and effects, simultaneously; and
- Establish a clear policy for media to be archived.

A highly adaptive digital media network is needed to accomplish these goals. The network combines

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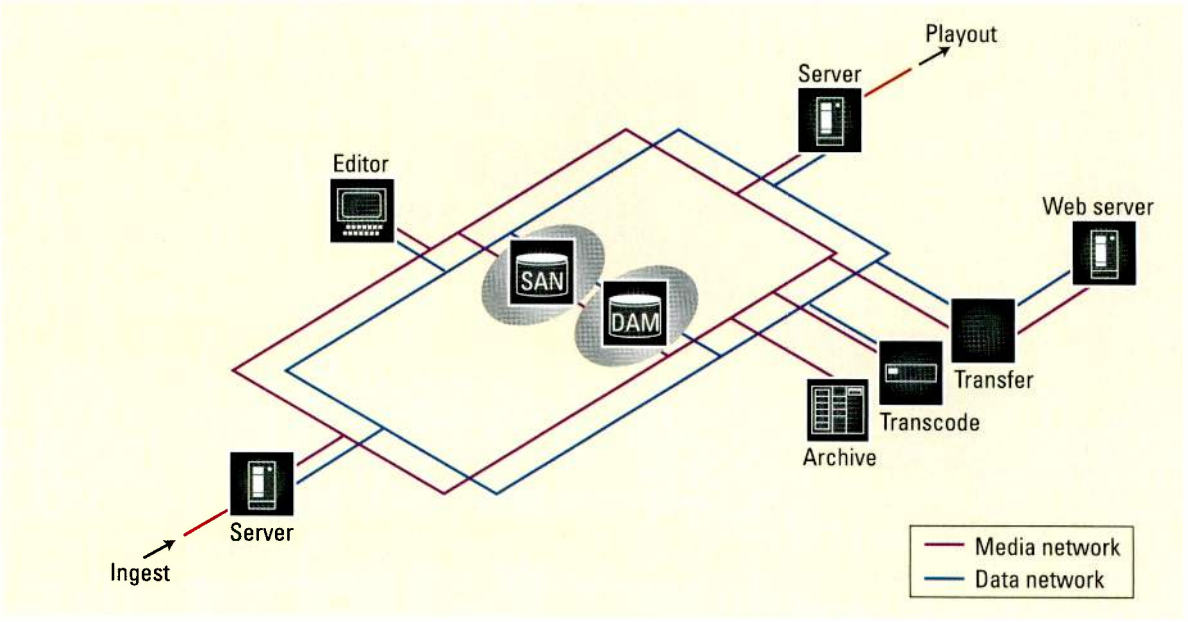


Figure 1. A logical view of a digital video system and content management network

the next generation of IP switching, routing and security infrastructure, with a digital media creation and management solution. The combination provides an integrated, multiservice IT architecture for digital content production and distribution — maximizing workflow efficiency and business continuity.

The network infrastructure will interact with all layers of the production process, including users, applications, metadata, servers and services. Thus, the storage area network (SAN), the type of network switches, security, Ethernet cables and digital asset management (DAM) system should be well thought out during the design phase. (See Figure 2 on page 62.)

The SAN

The SAN subsystem has to offer a common view of media resources across the network infrastructure, such as virtualization. It should be designed with a server chassis that has dual integrated switches for redundancy to minimize downtime, easy storage scalability and an open storage networked approach for faster access to content.

The SAN subsystem is the repository for content in a collaborative workflow environment. Therefore, content must be accessible at all times. To achieve this, servers are typically configured with multiple network interface cards (NIC) and dual-homed to the access layer switches for dual connectivity to the content.

Selecting network switches

All gigabit switches are not created equally. The network switches must have the capacity to handle a collaborative workflow with the intelligent movement of high-quality audio and video data across the digital media network, from ingest to playout.

Unlike regular data files, which can be segmented and reassembled, audio and video has to stream sequentially. This requires a network switch with the following features:

- Switching capacity of 136Gb/s and throughput of 102 millions of packets per second (Mpps);
- Agility and highly advanced, programmable, application-specific integrated circuits (ASICs);
- A distributed architecture and throughput;
- Optimized features for superior endpoint-to-endpoint performance; and
- Wired-speed, nonblocking architecture that offers reliability, availability and security to the network.

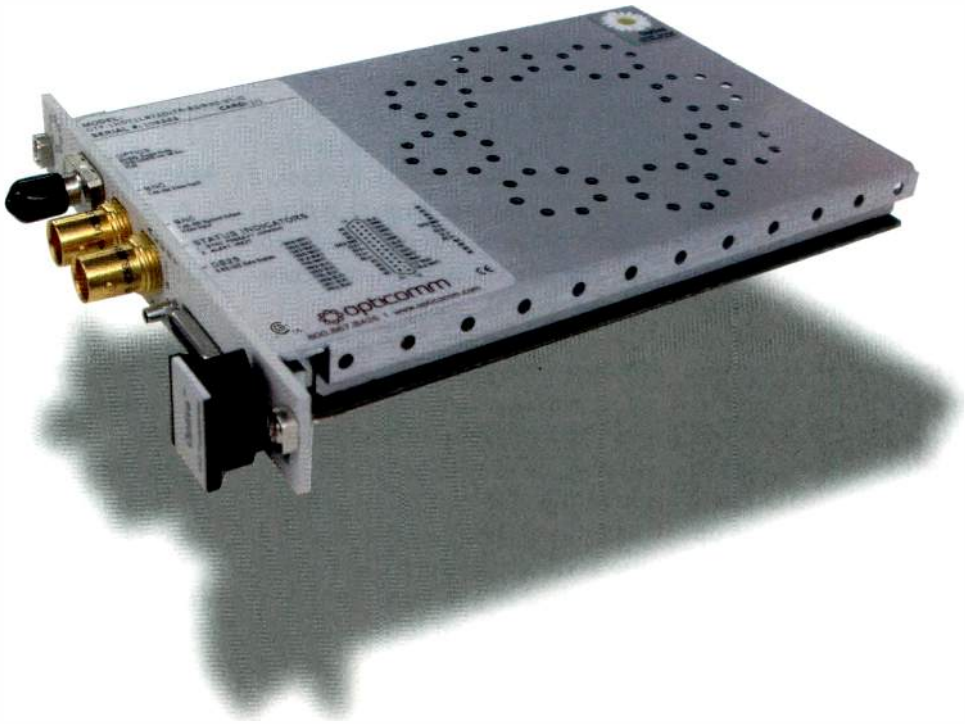
All switches connecting to the SAN must have:

- Layer 3 capability and 10GigE in order to handle inter virtual local area network (VLAN) routing;
- The ability to manage the high level of throughput; and
- The proper caching mechanism to handle the oversubscription level — which can be caused by the SAN and video application read and write I/O demand on a switch port.

Oversubscription occurs when the amount of internal switching fabric bandwidth allocated to a given switch port is less than the device connection speed at that port. For example, if a port on a switch has a connection speed of 1Gb/s but is unable to achieve wire-rate 2Gb/s of performance, then the port is said to be oversubscribed.

Routing between VLANs and the corporate network can be implemented by static or a dynamic routing protocol. For the purpose of redundancy, the network should be designed with a minimum of two access switches, and they should be configured with a redundancy protocol such as Virtual Router Redundancy Protocol (VRRP).

VRRP eliminates the single point of failure on the network. It also allows each switch to act as the master router for one VLAN and the backup router for another VLAN. In the event of a switch failure, the healthy



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switches will become the master router for both VLANs, thus keeping the communication path intact.

Securing the network

I once visited a client site and had to go through an extensive process in order to get access to the building. First, I had to clear one guard station, where I was given a token. Then, I had to present the token at a second guard station before I was given permission to enter the building. However, when I got to the server room and logged into the systems, I noticed they did not have any antivirus protection software or firewall for protection from the outside world.

It is important that business operators do not overlook the value of information that's moving over the network. Companies often go to great lengths to protect physical property, but do not discern the importance of protecting creative and intellectual assets.

The digital video system network should be protected with a firewall device that can process data at wire speed. Through the use of security applications and security policies, a network admission control regimen should be in place to inspect all people, applications and systems accessing the network.

Network cables

Meeting the high I/O demands of video editing applications requires an agile workflow with an IP base solutions infrastructure. The network cable of choice is gigabit Ethernet, also known as GigE or 1000BASE-T. GigE is base Ethernet and Fast Ethernet technology, and it comes in two forms: copper (Cat 5e or Cat 6) and fiber. Ethernet is the network media of choice for a LAN, so by using GigE, network engineers and architects do not need to relearn a new technology in order to implement and provide support for GigE.

Managing assets

A digital media creation solution should be attached to a DAM system that is built around an agile IT application and service infrastructure. The DAM system should possess the following components:

- Lightweight directory access protocol for tight access control and ease of directory browsing, and a cluster server configuration for high availability of the content database;
- An open platform that integrates applications and systems into the production workflow, and supports a

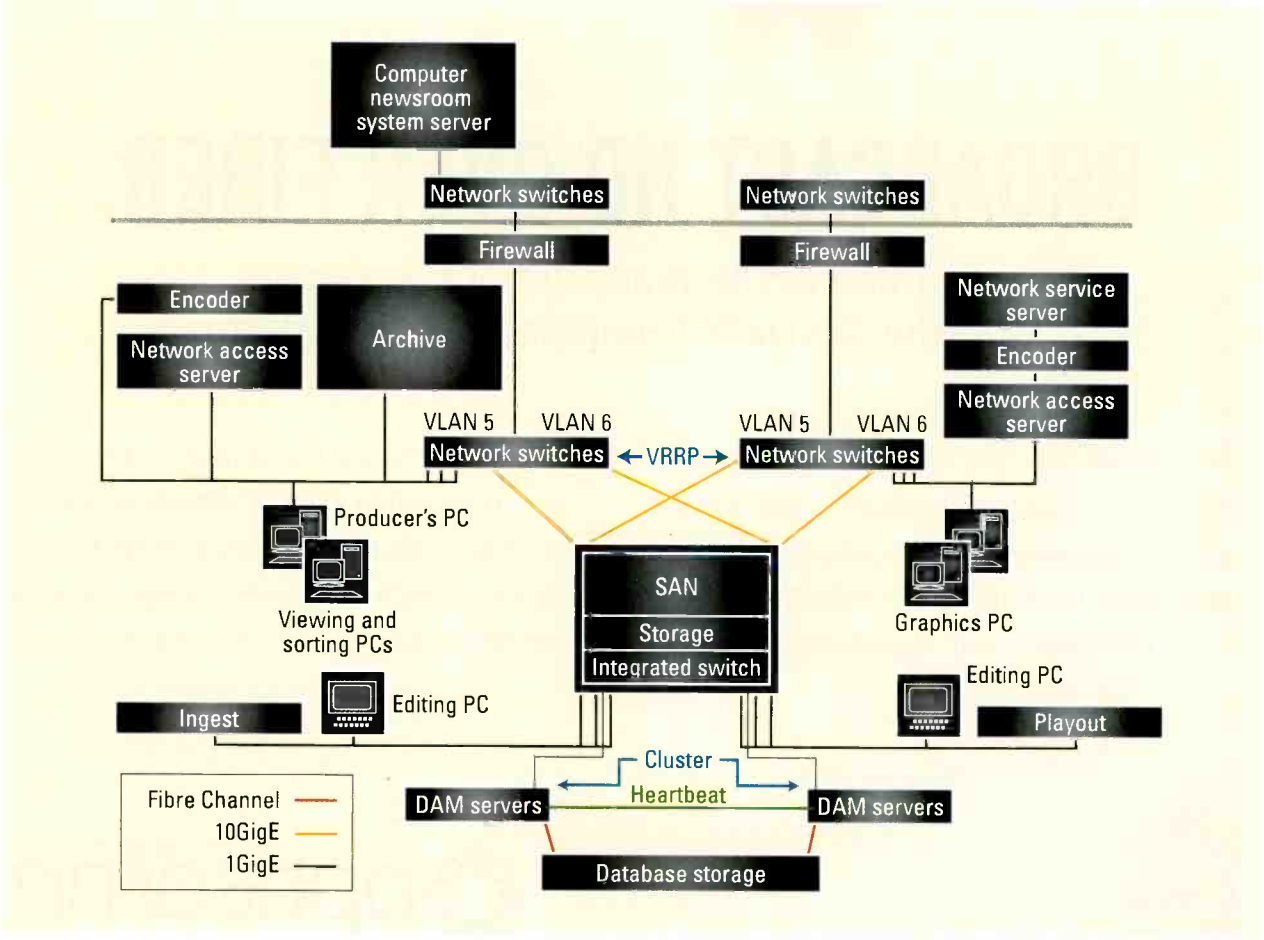

Figure 2. The network combines the next generation of IP switching, routing and security infrastructure, with a digital media creation and management solution.

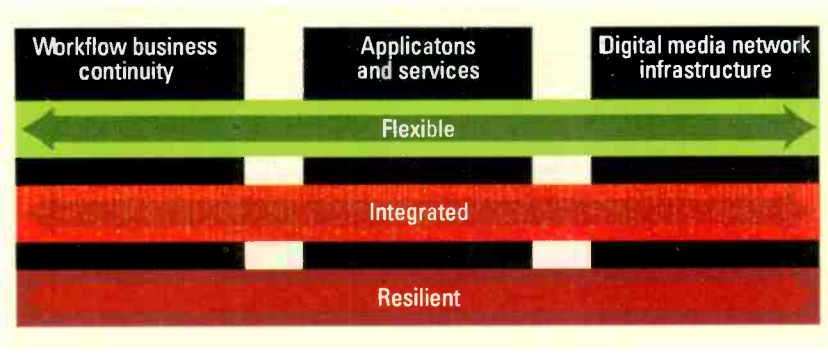

Figure 3. Today's workflows require an intelligently integrated business continuity framework.

wide range of industry standards and application programming interfaces (APIs);

- Content management tools and centralized administration;
- Access to up-to-date project assets and information for people across the organization, including producers, graphic artists, assistant editors, writers, storyboard artists, video and audio editors, directors, archivists, and legal and finance departments;
- Embedded control and communication, with automatic revision tracking, conflict management and integrated messaging — so noneditors can efficiently and accurately log and mark material;
- Task automation for such processes as encoding, transcoding and transfers in the background; and
- Archive tools that improve access while saving online storage space.

Meeting the demand of today's fast-moving workflow requires a highly adaptive, digital media network. (See Figure 3.) The network must intelligently integrate with the IT physical infrastructure and the IT service infrastructure to optimize rich media application management, security and throughput. This seamless integration is necessary to maximize workflow and ensure business continuity. BE

Dennis M. Glenn is a solutions architect for the Global Client Solutions group at Avid Technology. He is a Cisco Certified Network Professional (CCNP) and a Microsoft Certified System Engineer (MCSE) with more than 10 years of network design and system integration experience.

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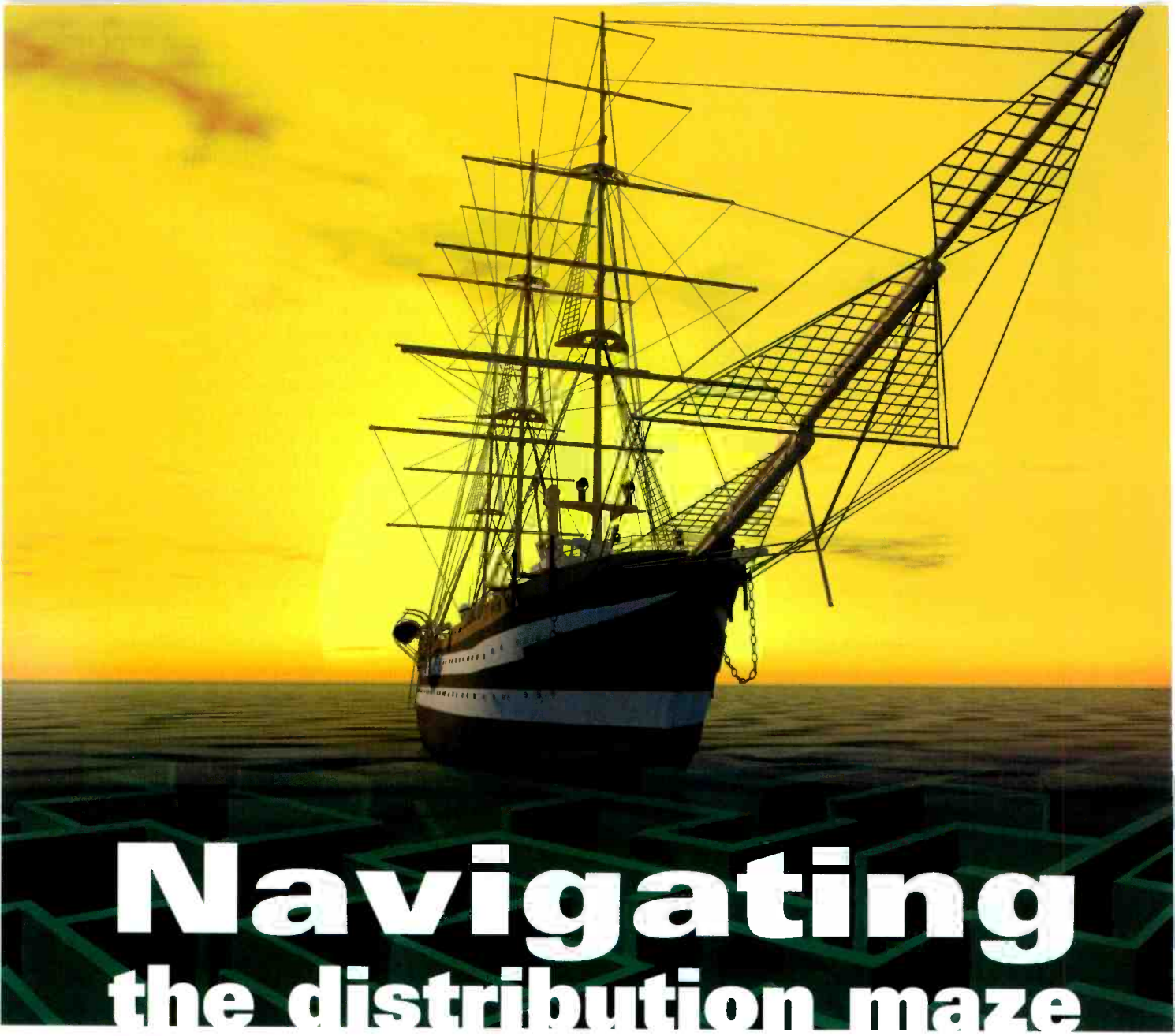

Navigating the distribution maze

BY TOM OHANIAN

The media and entertainment industry continues to adopt digital media in all stages of acquisition, manipulation and distribution. Whether the focus is broadcast, film or animation, across all media and entertainment segments, digital technologies for creating, managing and distributing content are in various phases of adoption.

Why is a digital media distribution strategy necessary? The media and entertainment industry is facing requirements that are summed up: Create once; consume anywhere.

This refers to creating a program master to provide all required versions for satellite, terrestrial, broadband, mobile and portable device delivery. Implementing a digital media distribution strategy is critical to meeting these business-driven initiatives.

Moving content

When was the last time you consciously thought about how content moves inside and outside your organization? Do you click the send button and cross your fingers that the content will actually get there? Perhaps you are still sneakernetting drives or copying and handing them off to bicycle-bound couriers or using overnight airline-based delivery. Or maybe you've run into worse trouble and had to recopy 300GB of data on a drive because the media wouldn't mount at the receiving location due to the dreaded "format unrecognized" error message.

When you have to worry about how you send, receive and coordinate the movement of content among many locations, there are a lot of concerns to account for. First is making those all important transmission deadlines. How close have you come to missing one? Second is maintaining security and prevening piracy.

Third, how do you plan to keep up with moving all digital media that your company generates? That includes accounting for getting all the new deliverables to where they must be on time.

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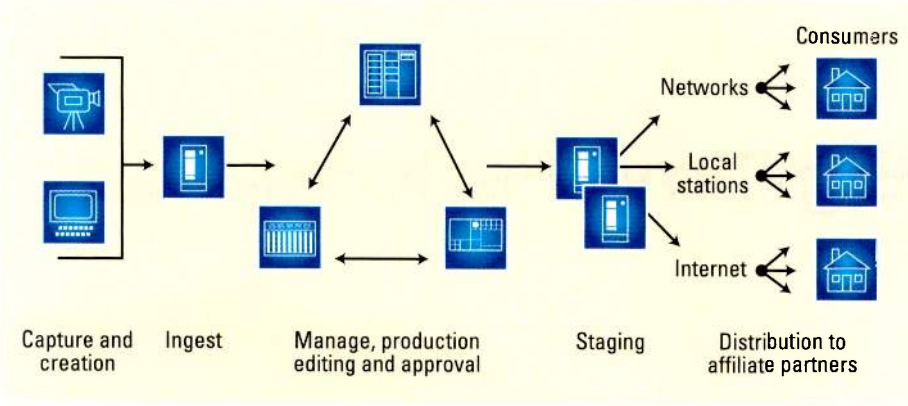


Figure 1. A typical content creation lifecycle from capture to mass-market distribution

Adoption of file-based workflows

While there is still an enormous amount of film and tape-based content, there is also an inevitable move to file-based acquisition using cameras that record on either optical disk or solid state. The creation of disk-based files has spurred the growth of file-based workflows where acquisition, manipulation, mastering and delivery are completely file-based. The simple notion of "a frame is now a file" requires a digital infrastructure to support file-based workflows. It is often helpful to classify workflow methodologies.

New workflows and requirements

Time to market demands and multiple distribution channels force us to adopt new technology and to adapt our workflows. Why is it important to carry programming in so many different forms and to so many different screen types? Let's consider some developments:

- In 1994, the average amount of time from start to finish of a major motion picture was 12 months. Today it is seven months.
- In 1973, according to John Kramer of EMAK Worldwide Marketing, a company that wanted to reach 95 percent of women aged 25 to 49 would need three network commercials. Today, 92 commercials would be needed to reach that same group.
- In 2001, the theatrical-to-video window was 165 days. In 2006, the window was 129 days.
- In 2006, it was estimated that an average of 62 percent of Internet traffic consisted of unmonetized video.

File-based workflows help to meet these various demands, but implementing such workflows does not come without complications. Figure 1 outlines the process of content acquisition to delivery. Note that each of the distinct processes is, in itself, cyclical.

Figure 2. An example of a global view of media transfers that can be centrally managed

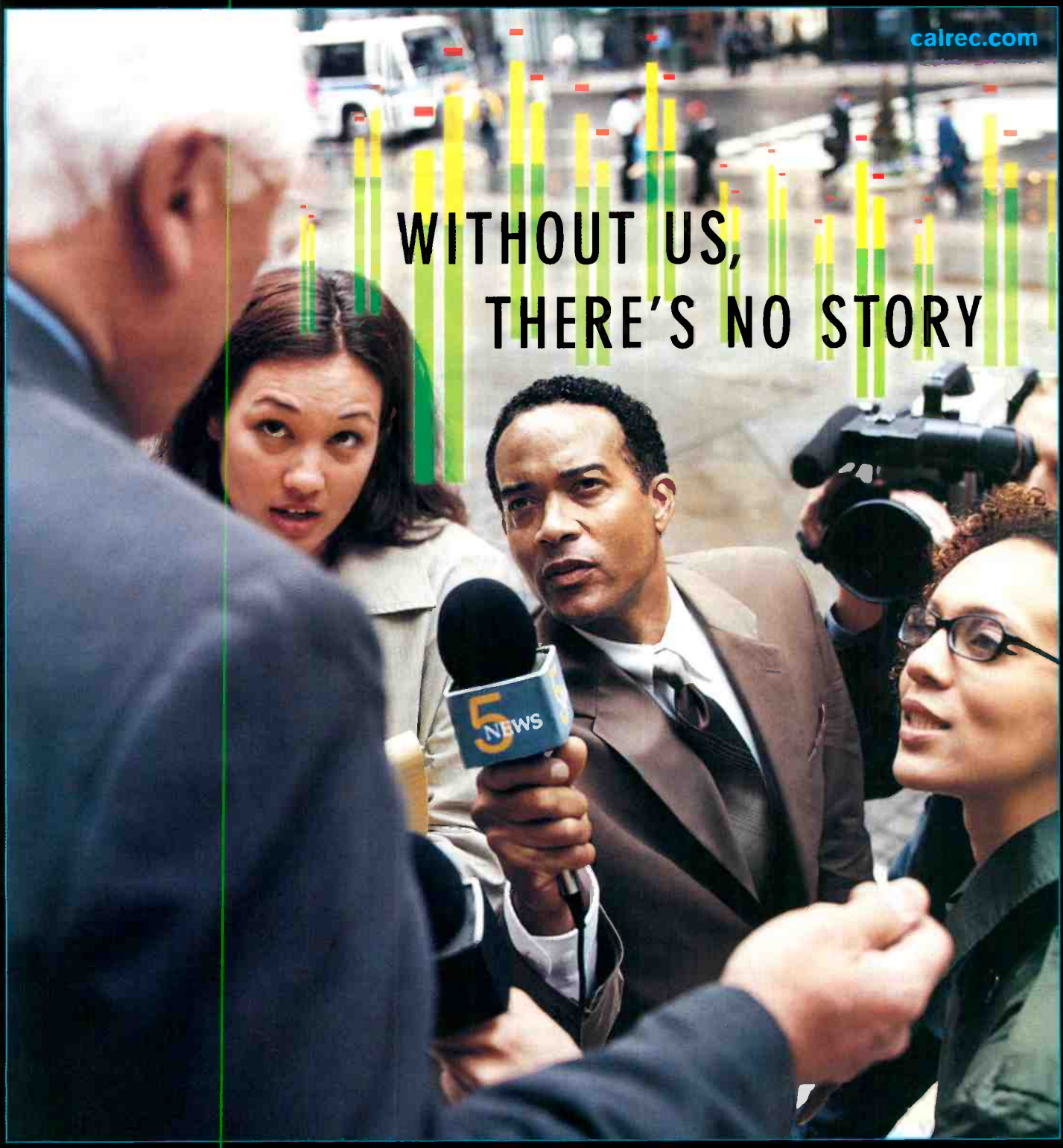
Requirements of a digital media distribution system

What are some of the functional areas and technologies that form the basis in implementing a digital media distribution system? They include:

1. *Centralized management.*
This refers to capabilities that allow users to determine rules and policies by which content is transmitted on the network. An example of this is the use of tiered pricing where content is assigned a high, medium and low priority designation for scheduled delivery.

A dashboard view of the media delivery system can easily provide that feedback. Figure 2 is an example of a global view of media transfers that can be centrally managed. Centralized management of digital media movement is indispensable in order to gain access to extremely valuable information, such as asset tracking, reporting, network and storage use, and billing generation.

2. *Network resource management.*
Functionality must enable users to manage the allocation of network resources and tie those resources to media transfers. This could take the form of real-time bandwidth allocation and readjustment to media transfers, for example. Or, perhaps, it is important that a series of media



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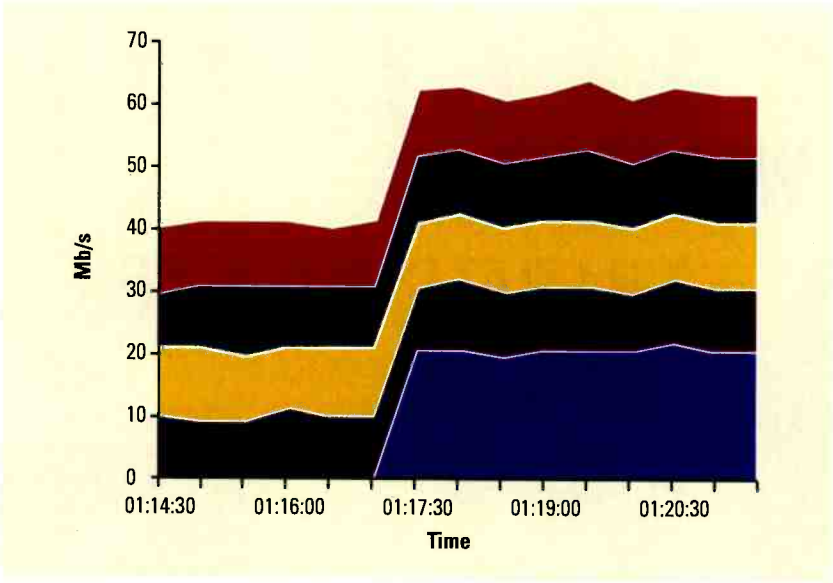

Figure 3. Real-time bandwidth allocation for transfers of greater or lesser importance

transfers being sent over a media path not exceed certain bandwidth limits imposed for that path.

In addition to standard TCP/IP networking capabilities, compensating for highly latent networks and providing WAN acceleration via employing user datagram protocol (UDP) is critical. Other standard networking techniques, such as check-pointing, snapshots and auto-resumption in case of line disruption, are all desirable. Figure 3 is an example of how bandwidth could be adjusted in real time in order to facilitate transfers of greater or lesser importance.

3. *Security.*
Data integrity and data confidentiality are implicit requirements of any digital media distribution system. Through a combination of Secure Sockets Layer (SSL), additional media content encryption, and the use of a public key infrastructure (PKI), digital certificates can be issued and signed, and mutual port-to-port authentication can occur. Transmission of content can result in the issuance of a digital certificate for each piece of content sent, and reports can be generated, proving that a specific piece of content was both sent and received.

4. *Automation.*
The automated processing and movement of content is also crucial to a scalable digital media distribution system. For example, a common workflow can be characterized by the following steps:

- Content is ingested and deposited into a folder on a storage volume.
- A process is run that interrogates the storage volume folder and upon

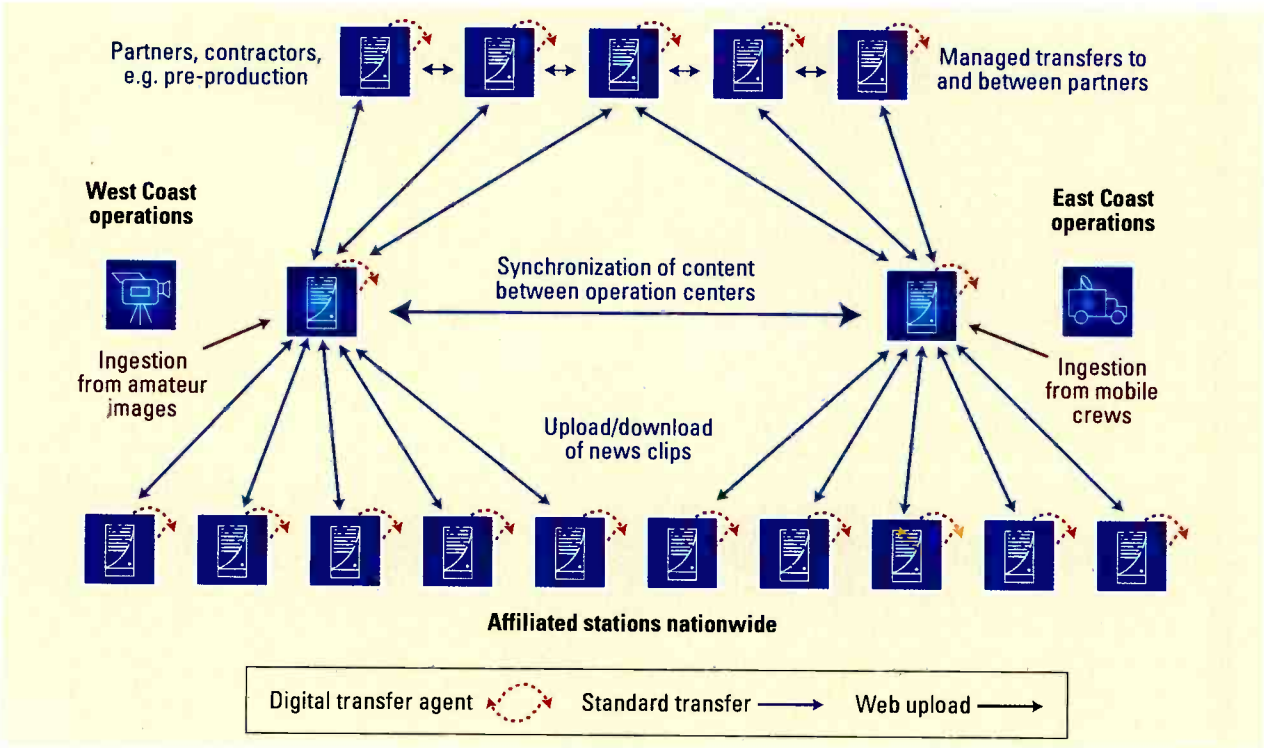

Figure 4. An example of a centrally managed digital media distribution system

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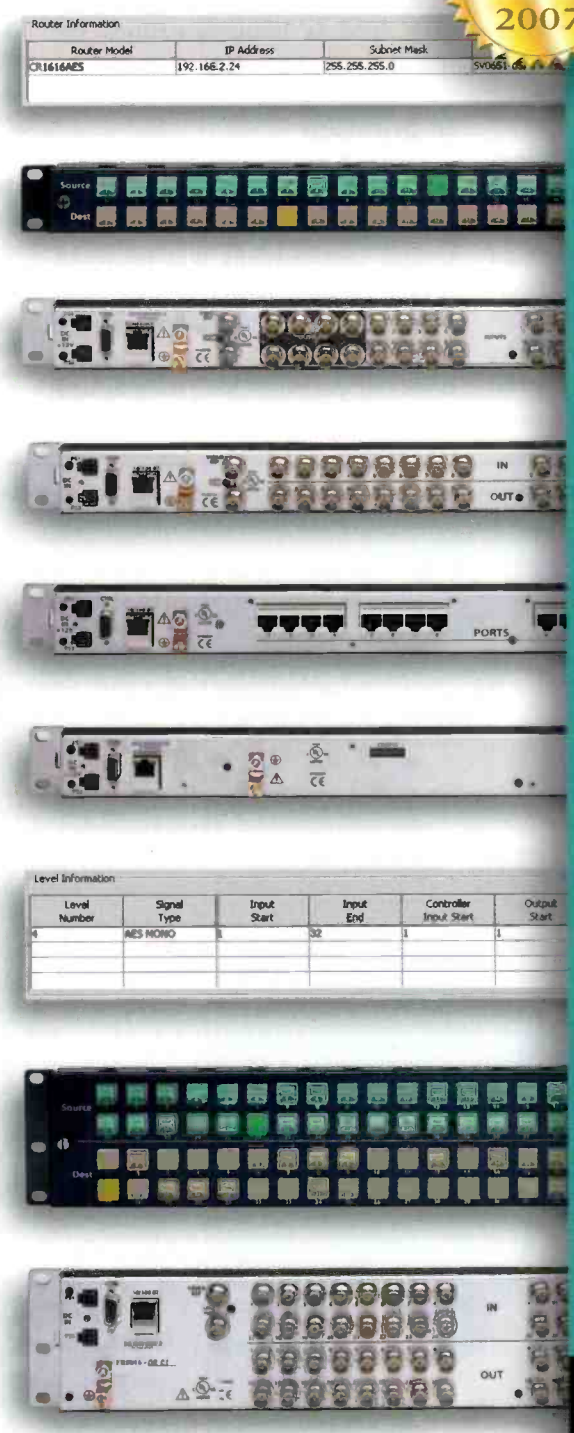

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detection of a file moves the file to an encoding system.

- An encoding system implements existing profiles to encode the file into multiple formats. These newly encoded files are deposited in a specific set of folders
- Finally, another process is automatically run which interrogates that set of folders, detects that new content is present and then transmits the files to their predesignated recipients.

5. *Performance and scalability.*
Another important aspect of a digital media distribution system is how many points of interest need to be served and whether the deployment is a client-server or managed peer-to-peer architecture. Fundamentally, how does the system need to be designed so that it can process not only the required job submissions but also handle the actual movement of content?

6. *Integration and interchange.*
The use of SOAP- and XML-based APIs further facilitates the interchange with and integration to systems found in the media and entertainment ecosystem for metadata, essence and device communications. SOAP interfaces enable powerful Web services implementations for interoperation between systems.

In practice

Figure 4 on page 68 shows an actual deployment of a digital media distribution system. In this example, central management is a mirrored configuration between East and West Coast operations. Data mover software is placed at specific locations representing O&O stations and key affiliates. For transfers to and from vendor partners, data mover software is also located at key areas. Finally, for ingest and review of both user-generated content and in-field staff videographers, a Web-based upload/download capability, which provides for WAN-accelerated file transfers, is provided.

In summary

Increasingly competitive and stringent business demands placed on the media and entertainment industry to create more content faster, to deliver it in more formats, to more places and to more devices. This has raised the necessity to extend the management and control oversight of the process to a centrally managed digital media distribution system. BE

Tom Ohanian is vice president of product management at Signiant. He is an Academy Award and two-time Emmy Award recipient.

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Emerging trends in file-based infrastructures

BY BRIAN CAMPANOTTI

The history of business is filled with examples of once dominant corporations that failed or were slow to react to technology change and lost their market advantage. Despite many indicators to the contrary, the leading players in these industries viewed themselves in a traditional way while the market around them was undergoing a fundamental shift toward a new business model.

Today, the trend in the broadcast world is toward divergent, fragmented audiences that demand relevant content on a multitude of nontraditional platforms. Content owners must efficiently and quickly evolve with the times to ensure future stability of their business. A mandatory evolutionary step in the broadcast world is to move away from traditional videotape-based workflows toward file-based infrastructures.

File-based implementations affect every aspect of the broadcast workflow from capture and ingest through post production, storage, distribution and transmission. Add to these considerations the delivery of multiformat and multitarget content, and it becomes a very complex puzzle to solve. It is essential that the platform

Photo: Storage must be tailored to meet the needs of the station at different levels. This may include storage on server racks, robotically, holographically or on tape decks. The Discovery Communications Television and Technology Center in Sterling, VA (shown center courtesy Discovery Communications), employs a Front Porch Digital DIVArchive, which manages the archive and nearline storage of programs for the channels originating from the playout center.

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assembled provides the greatest flexibility to adapt to emerging file formats as well as new modes of content distribution and consumption without placing additional burden on the human component of the workflow.

To accommodate the advanced requirements, state-of-the-art file-based infrastructures are built with CSM systems at their foundation. This middleware solution provides the integration and abstraction layer allowing high-level user applications, such as automation and media asset management, to communicate and transparently control the complexities of the vast underlying storage infrastructure.

CSM vendors now offer unified integration to encoding platforms, transmission devices, newsroom systems and NLE platforms. They also provide key functionality, such as transcoding and automated content lifecycle management. (See Figure 1.)

After A/V content is encoded into a file, a properly designed CSM-based infrastructure allows that content to be stored, replicated, repurposed, transferred and reformatted across high-speed local or WANs. It does this without any human intervention and at many times faster than real time.

A fundamental portion of the CSM solution is the file-based storage infrastructure. These high-speed, mass storage devices are constantly evolving, largely driven by the IT industry. For the broadcaster, a range of technologies are now available to balance performance, reliability, scalability and cost. Typically these storage technologies include fast SAN disk arrays for content-intensive applications; less-expensive NAS disk arrays, robotic data tape and optical storage libraries; and offline storage of media ejected from the robotic library but still actively tracked by the CSM system.

Disk arrays are fast and offer random access to content, but they do have significant downsides when parameters, such as cost per terabyte, scalability, cost of redundancy and disaster recovery, are all taken into account. In data tape-based robotic systems, linear access and mechanical characteristics (robot arm movement, tape mount times, positioning time, etc.) dominate. When comparing disk arrays with data tape-based robotic systems, it is obvious that

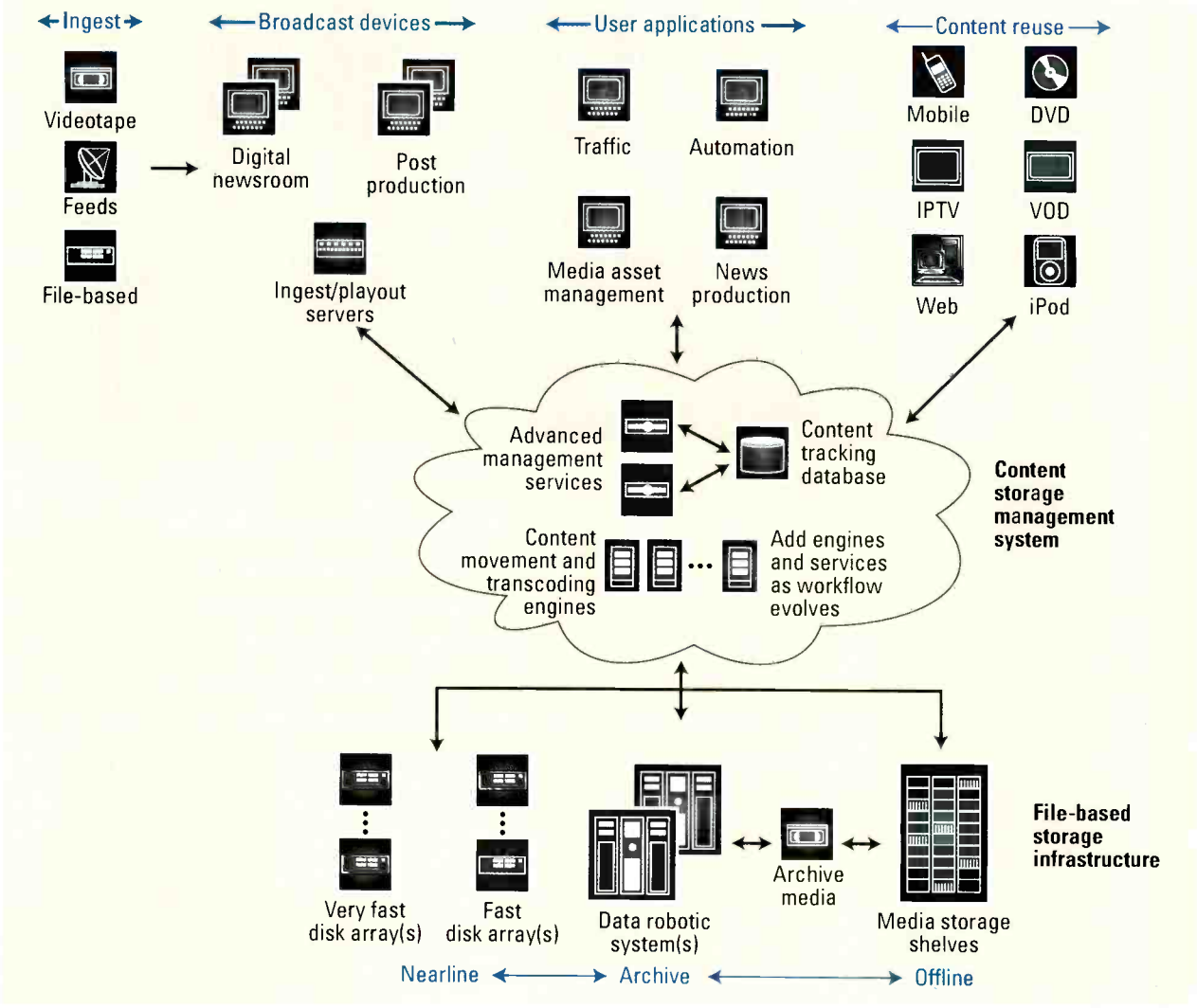

Figure 1. An advanced CSM-based infrastructure

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intelligent analysis is needed to choose and balance the correct storage technologies when designing an effective CSM infrastructure.

LTO-4

The evolution of data tape technology continues to advance at an amazing rate and can be considered mandatory for any future-proof CSM implementation. The latest and most compelling is the release of the fourth generation of LTO technology, LTO-4, supported as an open standard by multiple manufacturers. These tape cartridges have 800GB uncompressed capacity providing enough storage capacity for nearly 40 hours of IMX50 SD content. This represents a significant cost and real-estate savings over the same amount of content stored on traditional videotape stock. Even more impressive is the fact that each LTO-4 drive is capable of sustaining 120MB/s transfers, which equates to the movement of one hour of IMX50 SD content in a little over three minutes. This is considerable performance improvement over videotape-based workflows. Savings are increased manyfold when the human factors regarding videotape-based workflows, such as physical transport, replication and quality assurance checks, are also factored into the equation.

In a robotic library, 10 LTO-4 drives can sustain well over 1GB/s of sustained throughput and can scale from there depending on the content workflow demands as services and distribution evolve. These speeds are impressive, but are based on the prerequisite that the CSM solution itself can effectively scale to meet these staggering performance demands.

Robotic systems and optical media

The mechanical overhead and linear nature of data tape robotic systems cannot be ignored. However, they also do not factor significantly into the overall system performance of a properly designed CSM infrastructure. By designing a solution that includes a careful balance of nearline spinning disk augmenting a backend mass data tape robotic library, amazing performance can be achieved.

Optical media technologies, such as holographic and Blu-ray, continue to advance, but not at the same rate as data tape technology. Although they do exhibit random access performance closer to hard drives than to linear data tapes, their density, cost per terabyte and transfer rates still pale in comparison. These technologies better serve acquisition and front-end newsroom editing operations rather than long-term storage goals at this point, but this may change as technology advances.

Mechanical performance characteristics for robotic, tape-based libraries can be methodically calculated to provide tangible performance metrics that can be used to factor into architectural choices. Figure 2 plots the end-to-end performance of different optical and data tape technologies in robotic library systems. Taken into account are robotic arm movement and media load times, media mount times, media seek times and drive transfer speeds for content encoded

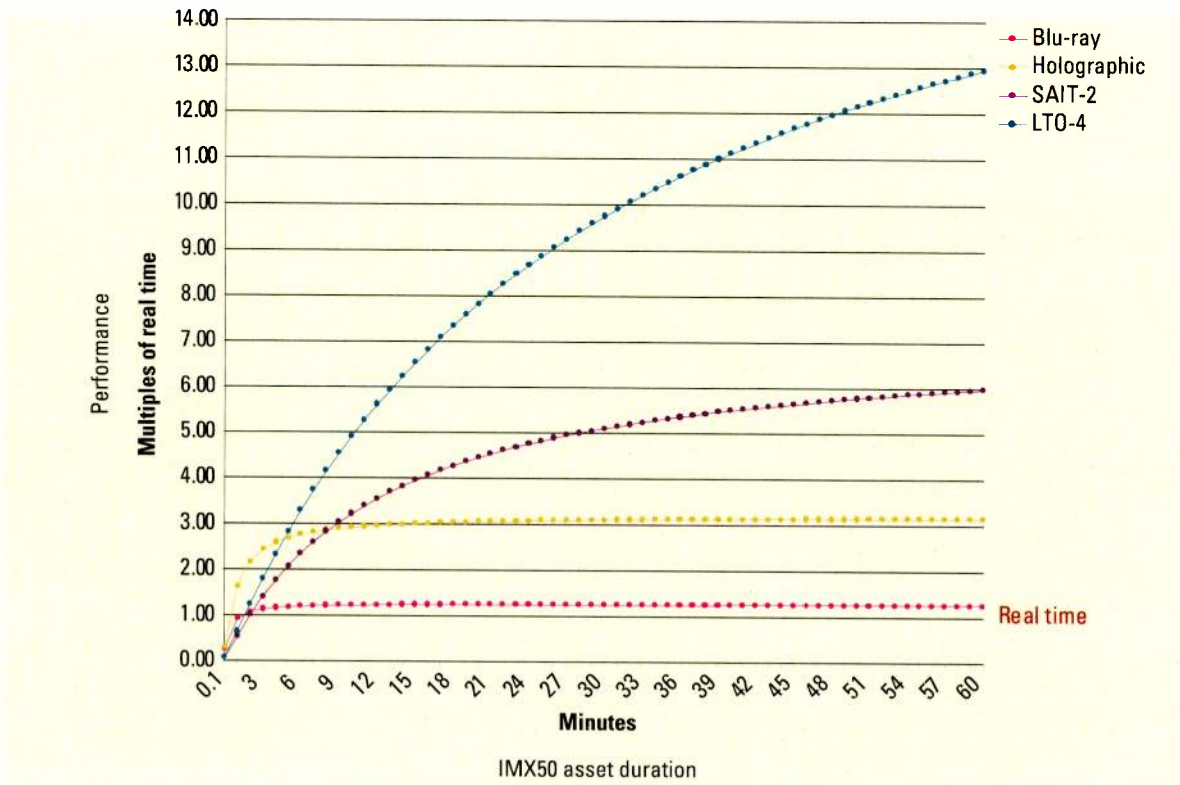

Figure 2. Optical and data tape drive/library performance summary

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at IMX50 (or DV50) rates. The horizontal axis plots the duration of this file-based content in minutes (which directly maps to file size), while the vertical axis indicates the transfer performance as compared to real time.

For example, a plot point at the intersection of a 30-minute IMX50 asset on the horizontal axis and 6.00 on the vertical axis means the CSM system could transfer the content in a mere five minutes.

The main conclusion to draw from this multidimensional comparison is for short duration content (left side of the plot in Figure 2), the mechanical characteristics of the drive/library dominate the overall performance equation. As we move to larger duration items (toward the right side of the plot in Figure 2), drive throughput becomes the dominant factor.

Key to recognizing the significance of this graph is to appreciate that file-based content in any media-centric environment, whether in news or post production, will statistically span the entire horizontal axis and are not specifically limited to small files only. From an operational perspective, it is likely more acceptable to wait 94 seconds for a one-minute duration asset to be transferred using LTO-4 technology than it would be to wait nearly 50 minutes for a one-hour asset to transfer using Blu-ray technology. (See Table 1.)

While arguably insignificant in real-world implementations, the impact of the mechanical characteristics of data tape-based CSM solutions for short-form content can be further reduced by introducing a small amount of spinning nearline disk managed transparently by the CSM middleware. This nearline storage acts as a transfer cache for content moving in and out of the data tape robotic system and allows short-form content to persist on spinning disk for quick access while also protected on one or more data tapes within the robotic library.

Advanced CSM solutions allow content lifecycle policies to manage the migration of content dynamically tuning overall system performance to match creative workflow demands. As an added benefit, nearline disk also provides bandwidth balancing between fast data tape technologies such as LTO-4 and significantly slower broadcast devices, which typically run at less than half their speed, allowing optimization of overall CSM system performance.

The spinning disk technology evolution continues to be driven by the IT industry and now affords broadcasters commodity nearline disk-based solutions. One technology worth briefly mentioning is network attached grid-based storage. These are emerging as the most compelling, cost-effective and redundant spinning disk technologies for advanced CSM implementations, specifically targeted toward media-centric applications.

The CMS ideal

Of course, the underlying storage technologies represent only a portion of the overall CSM infrastructure architectural considerations necessary to design an effective system. The ideal CSM solution must offer broad and proven integration with different types of workflow or application-specific storage and remain open as needs and technologies evolve. Key to the design and architecture of an effective and future-proof CSM infrastructure are other factors, such as:

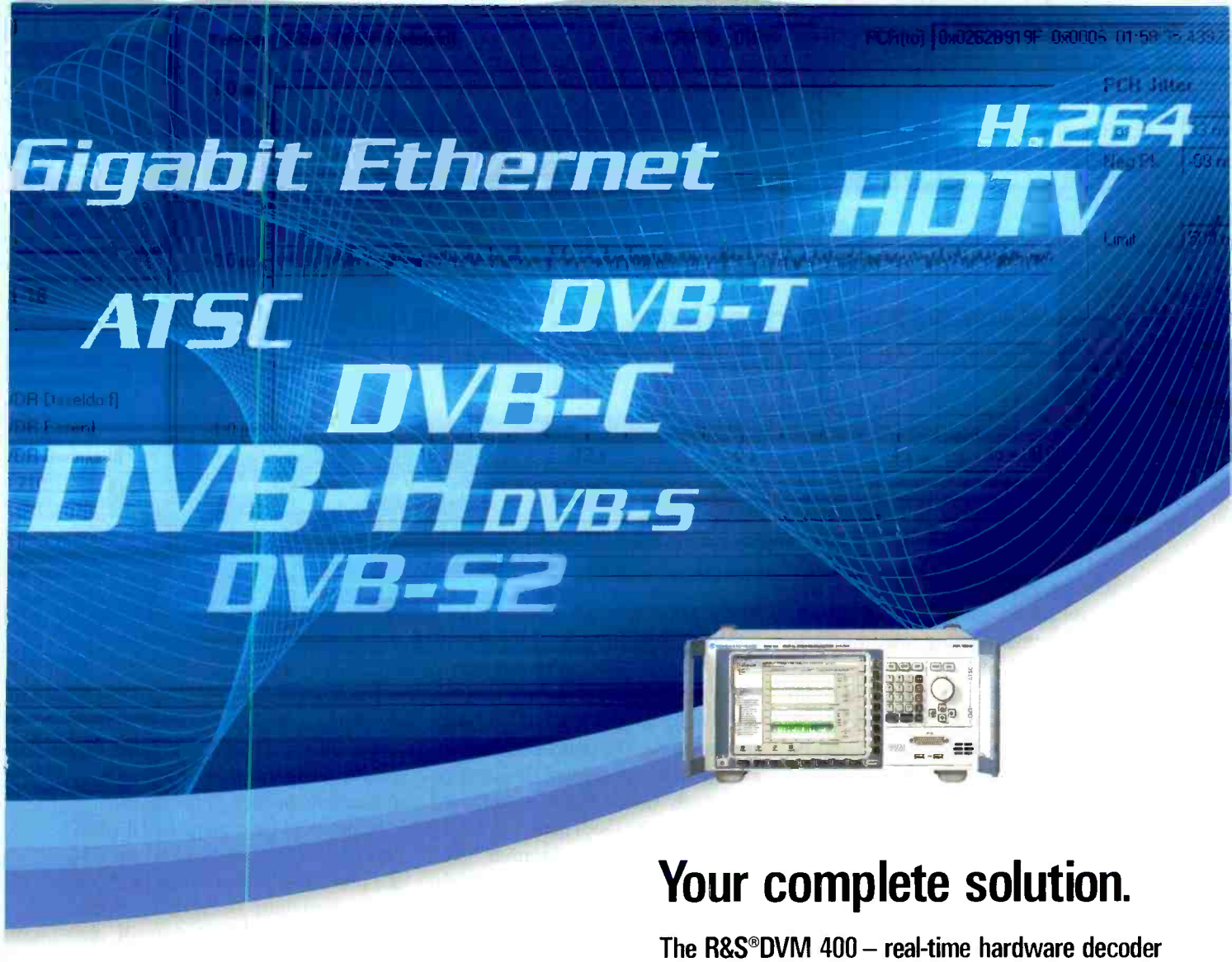
- Application-specific storage technology support with differing QoS;
- Seamless storage scalability and expansion;
- Support for existing and emerging content and storage technologies;
- Transparent storage technology migration;
- System bandwidth extensibility as workflows and demands evolve;
- Support for content reuse, analysis and other content-centric features; and
- Focus on long-term content protection of valuable file-based assets.

State-of-the-art CSM solutions are capable of connecting independent media-centric workflows into an enterprise-wide system that unites all the storage within an organization and serves each workflow according to its specific needs. In the diverging world of content delivery, the CSM system provides the essential extensibility and flexibility to adapt to new industry conditions and deliver maximum value from an organization's valuable assets. BE

Brian Campanotti is chief technology officer for Front Porch Digital.

Drive/library technology	IMX50/DV50 asset duration				
	1 minute	5 minutes	10 minutes	30 minutes	60 minutes
Blue-ray	1.1 minutes	4.2 minutes	8.1 minutes	23.7 minutes	47.2 minutes
Holographic	0.6 minute	1.9 minutes	3.4 minutes	9.7 minutes	19.1 minutes
SAIT-2	1.9 minutes	2.4 minutes	3.1 minutes	5.9 minutes	10.1 minutes
LTO-4	1.6 minutes	1.8 minutes	2.0 minutes	3.1 minutes	4.6 minutes

Table 1. Sample performance metrics for various drive/library technologies



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Dolby and Harris' X75 interface

The solution provides a single point of control.

BY RANDY CONROD AND JEFF NELSON

During the continuing HDTV rollout, keeping costs down — as well as saving rack space by using less equipment — is key. Audio has become as important as video, and one of today's major challenges is to incorporate both stereo and surround-sound mixes into broadcasting while maintaining video-to-audio timing and levels.

Harris' X75 interface is a single video processing device with integrated Dolby E and Dolby Digital decoding and encoding.

A single point for video and audio processing is considered a definite asset to new system designs. Easy access to the video processing with audio timing, levels and remapping is important when implementing HDTV with surround sound.

A/V processing

The initial design of the Harris X75 multiple-path converter and frame synchronizer included five AES inputs and outputs so that outboard Dolby decoders and encoders could be easily connected for a single video and audio processing point. While the design was being implemented, Dolby created small form factor options for the system that could be easily integrated for Dolby E and Dolby Digital (AC-3) decoding and encoding. The final design enables a single video processing device to be used easily with inboard or outboard Dolby products. (See Figure 1.)

The converter/synchronizer processes both video and audio signals. In today's hybrid production environment, both SD and HD baseband video must be accommodated, as well as analog, digital, embedded, and Dolby E or Dolby Digital compressed audio.

Video frame synchronizers for analog, SD-SDI and HD-SDI with processing amplifiers allow the user to level-adjust the video with genlock and timing. Video signals are up-, down- or crossconverted and aspect-ratio-converted as necessary. If required, additional delay is provided for matching to the audio portion of the signal.

Audio may be analog, digital (AES 75Ω or 100Ω), or embedded into SD-SDI and HD-SDI. Audio that has been compressed into Dolby E or Dolby Digital may be passed through untouched and properly aligned with video. At the same time, if required, the compressed stream may be decoded and processed along with the video. Gain may be applied, the audio signal inverted and delay added (or video delay) to match up the video-to-audio timing for lip sync purposes.

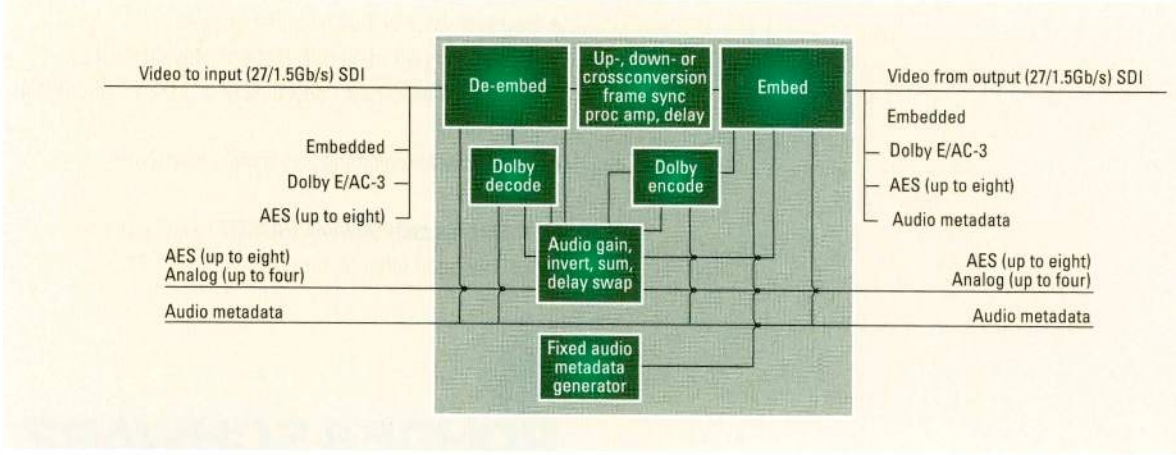

Figure 1. A simple block diagram of the X75 interface

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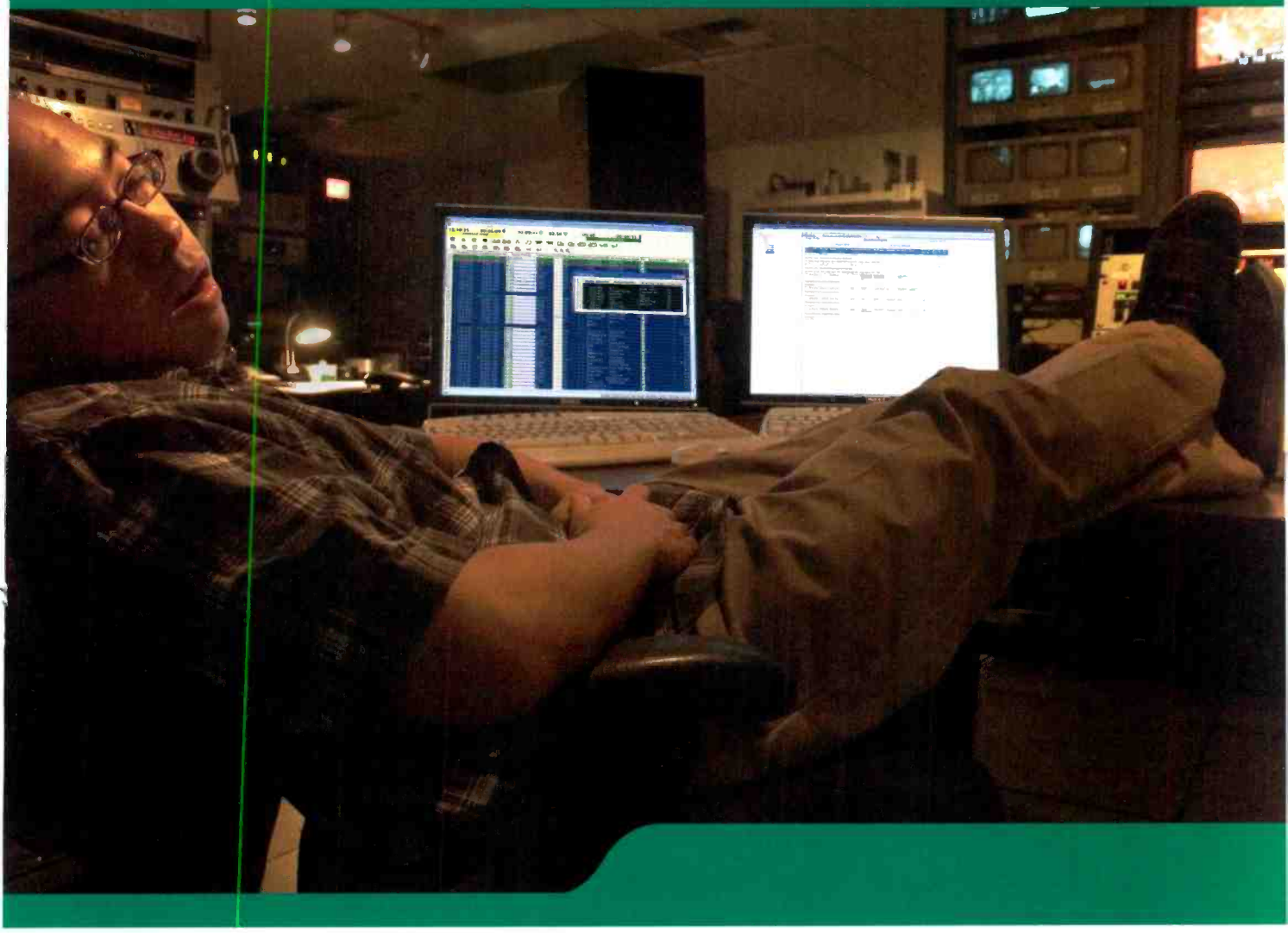

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Metadata

Dolby audio metadata may be handled in many ways. For upconversion of video with stereo audio, externally generated metadata used to configure the downstream Dolby Digital encoder may be inserted into the vertical ancillary data space (VANC), ultimately controlling the decode process.

The metadata stream also includes parameters that designate the number of audio channels in the program, as well as loudness normalization, dynamic range control and other key functions. A number of additional metadata values are for information purposes only.

When decoding Dolby E content, the metadata may be embedded into the VANC or provided as serial data on the data port of the device. When encoding Dolby E or Dolby Digital, audio metadata may be generated and authored, brought in on the data port as serial data, or taken from the Dolby E decoder to the Dolby E or Dolby Digital encoder.

Video and audio can be manipulated — for any application — for ingest into a system or before output from a system into a distribution or contribution channel release.

In addition to video and audio processing control, a single point of monitoring is important. Video and audio signals are monitored for signal presence with many user-settable parameters. Control and monitoring over an IP network is possible using a Web browser or dedicated GUI software.

Conclusion

The X75 multiple-path converter and frame synchronizer with integrated Dolby E and Dolby Digital decoding and encoding provides a single point of total control over the video and audio portions of a program signal. Video and audio can be manipulated — for any application — for ingest into a system or before output from a system into a distribution or contribution channel release. BE

Randy Conrod is product manager, Digital Products, Harris. Jeff Nelson is broadcast channel manager for Dolby Labs.

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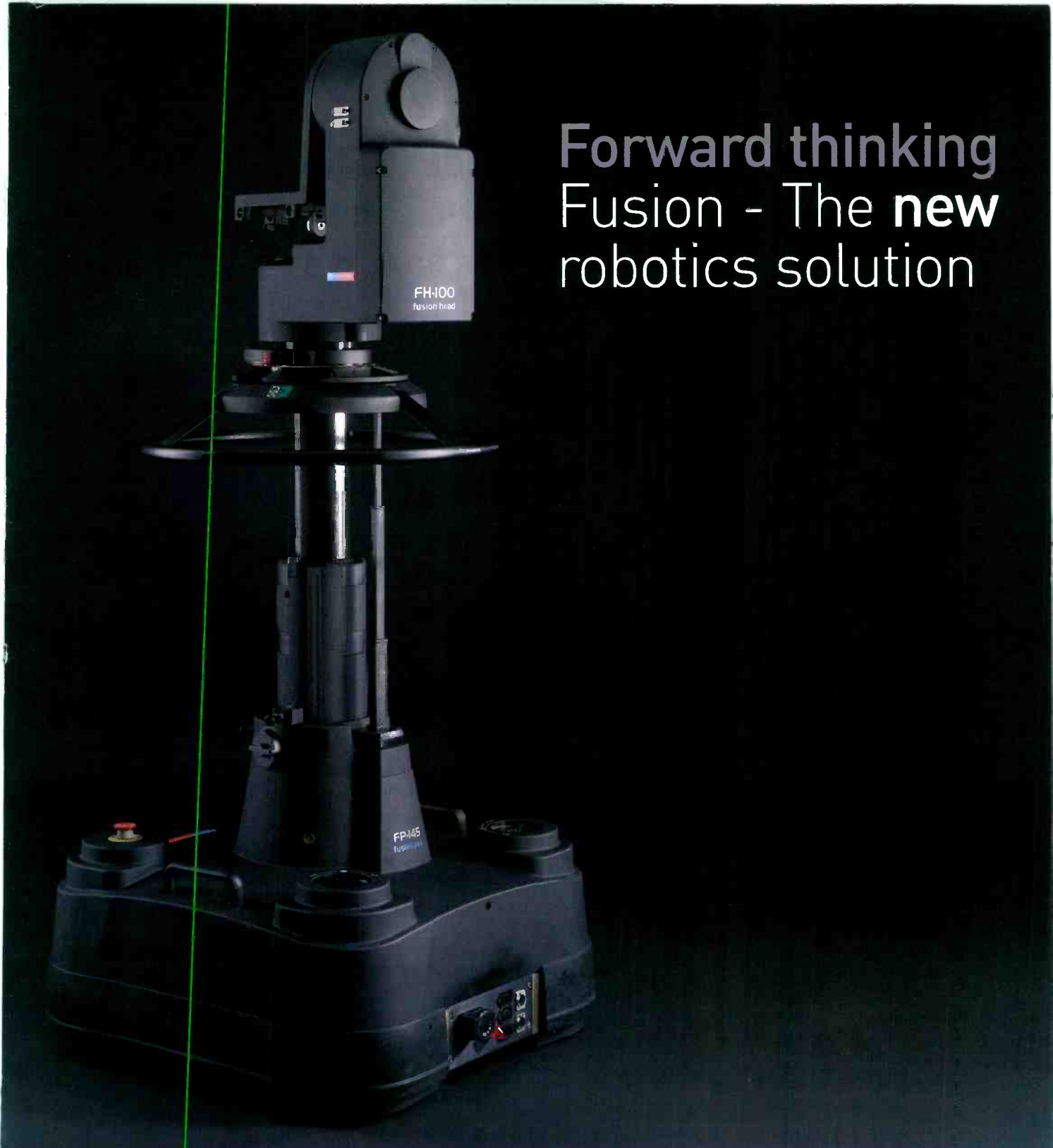

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The FPGA advantage

Fairlight's use of Altera's FPGA-based PCI card enables design flexibility, reduced cost and high performance.

BY TINO FIBAEK AND MARTIN S. WON

Professional media equipment designers have traditionally relied on digital signal processing (DSP) devices to provide processing power for audio and video subsystems. As these types of equipment grow more sophisticated to align with consumer expectations, designers are finding that costs and complexity are also increasing.

DSP devices are a general-purpose, fixed-architecture technology covering many applications. As a result, conventional audio and video subsystems must rely on multiple and costly acceleration boards, each containing multiple DSP devices. Not only is this an inefficient use of valuable resources, it also results in a longer development cycle and a system that consumes more power.

Figure 1. Fairlight's CC-1 board with Altera's Stratix II GX is 4in x 8in and replaces eight QDC boards.

Less is better

For better audio and video streaming performance at lower costs, Fairlight of Australia developed a media technology platform using a single Altera Stratix II GX FPGA-based PCI card rather than dozens of DSP devices. Tapping into the reprogrammability inherent in FPGAs essentially creates a universal hardware platform useful for a number of media applications requiring real-time audio and video processing power, from low-cost recording and editing platforms to large-format consoles with integrated HD video.

Industry studies show that an average DSP algorithm running on a low-cost FPGA provides up to 10-times better performance than it would if running on a low-cost DSP device. Costwise, FPGAs can generate from 10-times to 100-times improvement over DSP devices or microprocessors.

High-quality picture and sound

Fairlight's Crystal Core architecture, which uses a crystalline interconnect scheme at every level, is implemented in one or more PCI Express cards (called CC-1) connected to a host computer. The FPGAs in the system replace an eight-board, 64 floating-point DSP device-based design. (See Figures 1 and 2.)

The smallest configuration on a single CC-1 card delivers 240 channels into an 80 bus mixer. Each channel is equipped with eight bands of EQ and three stages of dynamics. A midsize system — providing an increase of 960 channels into 320 busses — is created in a host computer with four CC-1 boards. Larger systems may be assembled using multiple hosts with no limit to the number of linked processors.

With the CC-1 card, media equipment designers have a means to create the larger, high-performance A/V systems consumers are demanding, while also meeting their budget requirements. A system used for sound design can be reprogrammed for HD color grading and, later, for music recording. FPGAs bring hardware-coded DSP functions including real-time processing power, finite impulse response (FIR) filtering, and fast Fourier transform (FFT) processing.

Costwise, FPGAs can generate from 10- to 100-times improvement over DSP devices or microprocessors.

The flexibility of FPGAs means that many functions can be placed on the most efficient location in the logic flow of the device, rather than in peripheral hardware. For a design engineer, the result is a smaller and faster system that generates less heat.

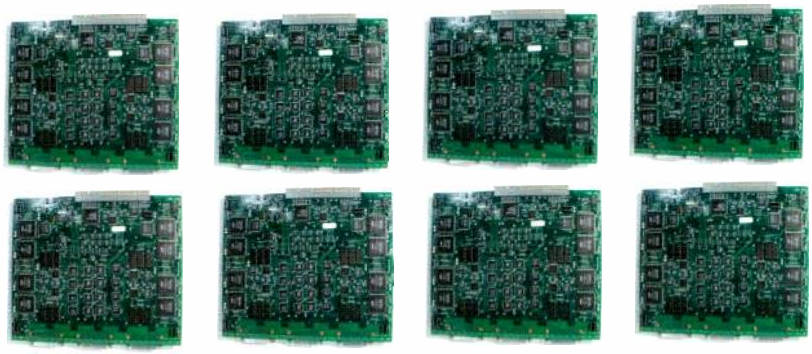

Figure 2. The Fairlight QDC board measures 10in x 10in. Altera's Stratix CC-1 replaces these eight boards.

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Also, the design process is simplified and less costly to undertake.

For audio processing applications, this media platform supports more than 200 channels of recording, editing, mixing, I/O and plug-ins. Latency is low, and full processing is available on each channel. Audio engineers can achieve better audio quality at a lower cost by choosing the appropriate level of processing for each system task, using a feature called dynamic resolution optimization (DRO). DRO takes advantage of the capability of an FPGA to simultaneously run multiple processes at different bit depths. DSP devices, in contrast, operate at fixed bit widths, performing all processes at a single resolution.

From a practical standpoint, using DRO means that equalization processing can be performed at 72-bit floating-point precision, mixing can be performed at 36-bit floating-point precision, and metering functions can be performed at 16-bit fixed-point resolution. For video processing applications, a single chip can play back and color-grade a full-uncompressed HD stream.

For audio processing applications, this media platform supports more than 200 channels of recording, editing, mixing I/O and plug-ins.

New opportunities for media equipment designers

Exploiting the flexibility and processing capacity of FPGAs, professional media equipment designers are gaining a cost-effective, power-saving alternative to traditional DSP device-only architectures. With this FPGA-based media technology platform, equipment designers have a reusable foundation for a variety of audio and video processing systems. Instead of resorting to multiple DSP devices, they can achieve better performance, lower costs, a smaller footprint and lower power impact with a platform based on a single FPGA hardware coded with DSP functions. **BE**

Tino Fibaek is the chief technology officer for Fairlight. Martin S. Won is a senior member of the technical staff for Altera.

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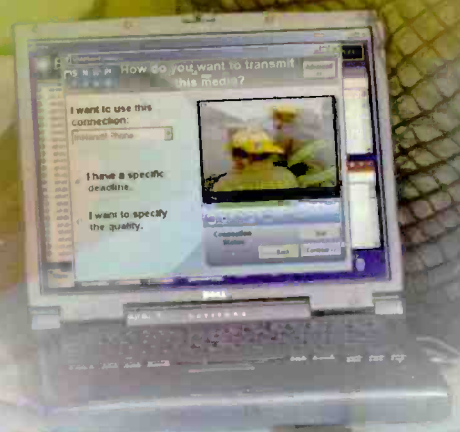

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CONTENTS

A letter from the publishers

In the news business, being second is never acceptable. Staffs know that their station benefits when they capture and air a story before the competition. This puts managers and engineers on the lookout for the tools and the technology to enable their news staffs to acquire, edit and air footage and graphics faster than the next guy.

Today, many stations rely on a file-based workflow to enable their production staffs. While that works well for SD content, what about HD? Broadcasters now realize that news can't just be an SD-only phenomena. As viewers see more HD content on their home screens, they expect all programming — including local news — to be equally as visually compelling.

If the HD production issues aren't enough of a challenge, two new screens have popped into view: the Web and mobile phones. Local television content, especially news, is now expected to appear on all three screens almost simultaneously. The dilemma for engineers and managers is how to cost effectively enable their staffs to produce this content quickly, in high quality and in a variety of formats.

To help engineers and managers meet this challenge, *Broadcast Engineering* and *Broadcasting & Cable* magazines have joined forces to produce a series of supplements and private technical symposiums focused on practical solutions. This supplement and symposium are focused on newsroom technology. We've assembled key vendor and industry experts to offer both their thoughts and experience and to answer your questions.

Whether you are just starting to broadcast news in HD or needing to move your content onto the Web and handhelds, the solutions you may need lie just ahead.

Johnathan Chalon
Vice President,
Entertainment Technology Division
Group Publisher,
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Larry Dunn
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Articles

The HD news transition S3

News moves to three screens..... S11

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Maintaining a competitive edge.....S28

KMBC-TV, the Hearst-Argyle-owned station in Kansas City, MO, is one of a growing number of stations to have launched HD local newscasts this year.

The HD news transition

Newsrooms grapple with the complexity of working in a mixed SD, HD environment.

Television news is all about showing viewers the relevant people, places and events affecting their world.

HDTV offers that audience a bigger, clearer view of their world than ever before, and consumers are responding enthusiastically. The Consumer Electronics Association predicted in June that 16 million HDTVs will be sold in the United States this year, taking the total number of high-def sets in the country to 52.5 million.

In terms of households, the CEA reported that as of that month, 30 percent had HDTVs, and that by the end of 2007, the figure will grow to 36 percent. Local station and network news organizations have responded as well. Industry estimates put the number of stations on air with local HD newscasts at between 50 and 60 and growing every week. The three network nightly newscasts are making progress toward HD. CNN Worldwide went HD within a little more than a month ago, and CNBC HD and the Fox Business Channel in HD will launch this fall (and may have done so by the time this is printed).

There are a variety of reasons networks and stations launch their newscasts in high definition, but ultimately they all boil down to the viewer.

"I think truly when you are doing news at the local level, the main focus you have to have is on the viewer," says Shawn Bartlet, general manager of Cox Television's WFTV in Orlando, FL, which launched its own local HD newscasts in July 2006. "I think if you are not serving that viewer, there will be a cost associated with that."

Time of transition

As more stations face how best to deliver HD news to a segment of their audience while continuing to present their newscasts to the majority of viewers watching in SD, they approach a critical crossroads.

"At this point in time, customers are facing perhaps their most option-filled set of choices about where to take their production as well as their hardware platforms," says Fred Schultz, senior marketing manager for news solutions at Harris. "They have a great interest in preserving those options as far down the decision-making process as they can achieve."

At issue is how best to serve both SD and HD audiences without becoming tied to a technology that forces newsrooms to decide on an editing platform before they're ready to commit to a final format mix, he says.

"Given that they are all going to be three-stepping their way into HD from SD — first with the studio, then with the chauffeured HD driven back from the field and finally with microwaving from the field — it's not that clear to many of them what their actual edit needs are going to be," Schultz says.

A news photographer for 24-hour regional news cable station NECN in Boston shoots with Sony's XDCAM camcorder.

To accommodate that uncertainty, Harris not only has integrated support for its own NewsForce Editors into its servers but also Apple's Final Cut Pro.

Omneon Video Networks also recognizes the need to offer mixed format support and preserve choices about editing applications, says Chris Lee senior director, Broadcast Solutions for Omneon Video Networks.

"Omneon's dual-format capabilities are one of the key reasons the company is making serious inroads in news," he says. "Our servers allow users to mix SD and HD content, and edit them both with Final Cut or many other editors. There's no reason for a newsroom to try to make the transition overnight."

The flexibility to drop SD and HD source material onto the same editing timeline effortlessly is at the heart of Quantel's Newsbox and Enterprise sQ, says company CEO Tom McGowan.

"Picture I am an editor sitting at my Newsbox. I have SD 4:3 and HD 16:9 clips on my same timeline," he says. "I decide I am finished editing that 100-clip story, and I want to play it out in HD. As we play it out in HD, all SD will be up-resed on the fly. If I elect to playout in SD, it will down-res all HD material to SD. It also will play both out in parallel."

Such flexibility means the focus of news production can be "about creating the story and not manipulating the formats," he adds.

For stations planning to add HD news, accommodating both SD and HD for contribution as well as the distribution is a sizable issue.

"The biggest surprise that I had was the amount of conversion gear," says Jerry Agresti, KMBC-TV director of engineering. "The number is huge."

Shortly after relocating to a new broadcast facility in Kansas City, MO, the Hearst-Argyle-owned station took its newscast HD.

"I don't want to sound like we went into it with our eyes closed," he says, "but the count of conversion devices is amazing."

Andrew Suk, director of broadcast engineering for Cordillera Communications, which launched HD local news at its stations in Tucson, AZ, and Lexington, KY, agrees.

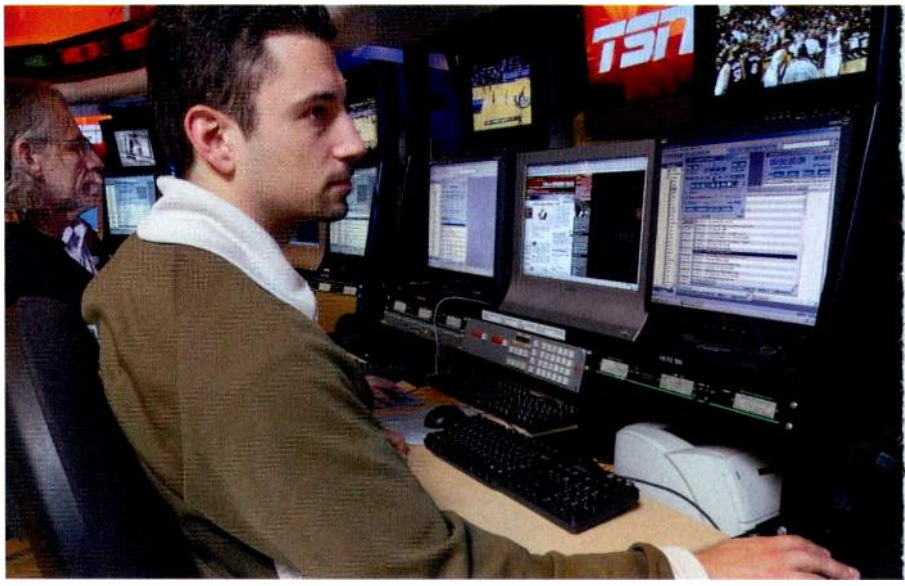
"I think a lot of the glue product sneaks up on you," he says of the transition to HD news. "The number of conversions you need to be making — just the little nickel and dime pieces, which unfortunately are usually measured in $1000 and $2000 increments — those are the parts that throw you."

With its new Vision and legacy multidefinition switchers, Ross Video has attempted to keep the number of converters required for news production to a minimum, says Darren Budrow, the company's director of sales.

"You can either integrate those up/down/crossconverters and resize directly in the switcher, or you can have them external," he says. "We decided to go external."

The switcher itself can operate in SD or HD mode, supporting 720p, 1080i at 24Hz, 50Hz or 60Hz.

"What happens if you have 10 sources; nine of them are HD and one is SD?" Budrow asks rhetorically. "Our solution is to set the switcher to be HD and convert that one SD device to HD. What happens if your facility evolves to an absolute mix — 50 percent SD and 50 percent HD? You could put a single converter on each one of those SD sources, or you could let



An operator ingests sports highlight material onto a Harris NEXIO HD/SD SAN at TSN HD in Toronto.

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the switcher do this for you. Just using a mathematical formula, we can figure out the worst-case scenario — the number of converters you would actually need in any one production."

The Thomson Grass Valley Infinity Digital Media Camcorder supports a file-based workflow from the point of capture.

Out and about

The consequences of working in a mixed SD, HD world extend beyond the control room and into the field.

"First of all, we have to train our camera people on what HD is versus SD," says Bob Ott, Sony VP marketing, optical network and pro audio-video products. "That may sound a little specious, but what we're finding in the early stages of this is that you have to teach them some of the typical things that have to be understood, like they are in a 16:9 format simultaneously dealing with 16:9 and 4:3 worlds."

News photographers in the field must understand that for the foreseeable future, when they shoot 16:9 — whether it's in SD or HD — they have to do so with a 4:3 safety area in mind, he says.

"News is kind of forgiving," Ott explains. "If there is a grip standing there with a light in the sidebars, it's not a big deal. But if they are doing documentaries or any other program, it becomes an issue obviously."

Still the transition to HD and dealing with the disruption it can bring to field production, workflow in the newsroom and control room operations is significantly less today than only a few years ago.

"From the standpoint of disruption, obviously HD would not have been a good idea in the year 2000," Ott says, "but we've evolved quickly so that by the year 2007, HD editing now is even supported on Mac and PC laptops by multiple NLE manufacturers."

There's ample evidence elsewhere that the industry is making accommodations for HD. For instance, satellite resources now exist to handle the anticipated growth in demand for HD news backhaul.

"There is still a demand out there for field operations to migrate from standard def to high def," observes Ron Rosenthal, Intelsat regional VP North America, broadcast solutions. "As the various news organizations have upgraded their studios to HD, they are still currently providing at least 90 percent of their packages and their live shots in SD. However, this represents an increase in demand, right now, for HD news feeds. We're uniquely positioned to provide our customers with managed solutions anywhere in the globe for HD content."

Rosenthal points to this summer's Live Earth concert as evidence of Intelsat's HD capacity and ability. While not TV news, the event required significant satellite and teleport capabilities.

"In one single day, Intelsat provided content from seven different continents all in HD for the purpose of global retransmission," he says. "So not only did we handle the contribution of the event, but also the global distribution of the event as well."

As stations, groups and networks grapple with the minutia of these and other issues involved in presenting HD news, it's easy to lose sight of the bigger picture. All of the changes and accommodations HD demands are serving a greater purpose: better connecting news viewers with their world and depicting the people, places and events that make up the news in a more true-to-life fashion.

As Bob Hesskamp, VP technical operations for CNN Worldwide's news division, says, "HD gives us the ability to bring our viewers closer to the story. It comes alive, much like when you watch a sporting event in HD; the game is more real to you. I think the news is more real to you when you see it in HD. It's beautiful. The disturbing news may be more disturbing, and the beautiful, inspiring news is going to be more beautiful and more inspiring." ◀

The Sony XDCAM, which records to optical disc, stands up to the inclement conditions of shooting the Iditarod dog sled race in Alaska.

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Gaining momentum

Sprint Nextel's VP of spectrum development discusses where the 2GHz BAS relocation stands.

On Sept. 7, the very day the Broadcast Auxiliary Service (BAS) relocation was mandated to be completed, the FCC waived the deadline it had imposed 31.5 months earlier on Sprint Nextel and BAS licensees to relocate BAS Channels 1-7.

Under the original plan, Sprint Nextel and BAS licensees were given a little more than two-and-a-half years to replace existing analog microwave radios, antennas and related equipment with new digital gear and relocate the seven channels to a swatch of spectrum from 2031.5MHz to 2103.5MHz, divvied up in 12MHz wide increments.

Three days before the waiver was granted, the company — along with NAB, MSTV and SBE — jointly petitioned the commission to extend the Sept. 7 deadline for 29 months. In issuing the waiver, the commission set a new deadline of Nov. 6, giving itself 60 days to consider the petition.

The man ultimately responsible for the success of the project is Mike Degitz, Sprint Nextel VP of spectrum development.

Q: Where does the 2GHz relocation project stand?

Mike Degitz: We've turned the corner. We're getting beyond the contracts and negotiation phase, and we are entering the installation phase. There's a lot of equipment out there being installed right now and a lot of lessons being learned. There have been some challenges learning the nuances of the new equipment, but it's all getting figured out, and that's going to be lessons learned. Hopefully, things are going to pick up from here.

Q: What were the major obstacles that prevented the project from being completed on time?

Mike Degitz: This whole project is just larger than anyone ever imagined. It's the complexity of everything involved here — the fact that you have equipment that's been out there for 30 years. Usually it's not just one chief engineer who installed it, but several chief engineers.

To figure out exactly what they have and design a system to replace it takes a lot of effort on both the station's part and the manufacturer's part. Then that has to be put into a contractual form. It just took a long time to get this work together.

Q: Wasn't one of the concerns over income tax liability?

Mike Degitz: There were a couple of biggies. The income tax issue was one. One of the groups got a private letter ruling from the IRS that stated that this is a tax-free transaction, so the stations are not liable for income tax on this.

The other big issue was getting a standard contract written that the majority of the broadcasters could agree to. It took a long time to hammer out. Everybody's got different interests, and to get everybody on the same page took a long time. That was probably the biggest logjam, and then the tax issue. Once that got resolved, things started moving.

Q: How does this relocation effort compare with others?

Mike Degitz: Sprint Nextel has done other relocations, but it's mainly been involved with private radio networks. Now we're working on the 800MHz relocation, which is just as big as this one. It's much different though in that the amount of equipment that's being exchanged is not the large systems as with the BAS relocation. It's individual pieces in the system — the handsets primarily. So it's a little different scope. Money-wise, it's a larger project, but in terms of complexity, it's not as complex.

That's one of the problems we've had. No one's ever done this before. ◀

Phase*	March 2007	September 2007	Percentage increase
1a. Markets kicked off by Sprint Nextel	100%	100%	Complete
1b. BAS stations engaged in transition	100%	100%	Complete
2. Inventories submitted by broadcasters	99%	100%	Complete
3. Inventories verified and agreed by Sprint Nextel	80%	99%	+24%
4. Quote packages submitted by broadcasters	35%	66%	+78%
5a. Quote packages approved by Sprint Nextel	30%	61%	+103%
5b. Frequency relocation agreements signed	22%	48%	+118%
6a. Purchase orders submitted by broadcasters	17%	41%	+141%
6b. Purchase orders fulfilled by manufacturers	5%	15%	+200%
7. Equipment installed by installers	2%	8%	+300%

2GHz BAS relocation status. Courtesy Sprint Nextel.

Three-screen destinations for news content — including traditional broadcast, satellite and cable TV as well as the Internet and mobile devices such as cell phones — require TV journalists to re-evaluate who they are and what they do. Shown here is BSkyB's interactive sports channel, Sky Sports Active, where Harris NEXIO and NewsFlash editors are used to edit high ight packages.

News moves to three screens

News audiences are turning to the Internet, cell phones and mobile devices.

Cell phones, mobile TV devices and the Internet may be creating a bit of an identity crisis these days for TV newsrooms.

Are the journalists who work there broadcasters first, or are they content providers? That seemingly simple question is packed with implications for how stations approach news, select technology and allocate resources.

"What we really have to start doing is understanding that the Web is no longer a necessary evil," says Johnathon Howard, Avid Technology director, Broadcast and Media Publishing. "It's going to be part of survival going forward for traditional broadcasters. The competition is coming after the eyeballs that TV stations have previously owned."

In other words, if stations don't look for ways to leverage the Web, they risk losing ground to newspapers and others that do.

With their long track record of covering their local markets and an ability to gather raw news footage and turn it into stories, local stations have a leg up in this competition for now.

"Broadcast television newsrooms have a great advantage," says Ed Casaccia, director of product management & marketing for Thomson Grass Valley Digital News Production. "They already have the infrastructure in place to go out and acquire the actuality material. They've got the crews to do it, and they are beginning to think of themselves more as content producers and less as (being locked to) transmitters.'

Paul Slavin, ABC News senior VP newsgathering, agrees.

"We need to find ways to morph our businesses in that direction," Slavin says, "and we need to find the value that we — particularly in broadcast and television — can bring to those mediums."

Content approaches

For television stations with limited staffs, resources and time, creating content for the Web and cell phones can be challenging. Certainly, running the same exact story on a Web site or cell phone that aired is the easiest approach, but it probably also is the least helpful.

"One of the biggest things I've seen — and that I find frustrating— is that we hear broadcasters saying, 'For more information, go to our Web site at www.whatever,' and when you go to that Web site, it's the exact same content you saw on TV," Howard says. "It's not unique content."

Repurposing content offers a more appealing approach from an editorial point of view. If done

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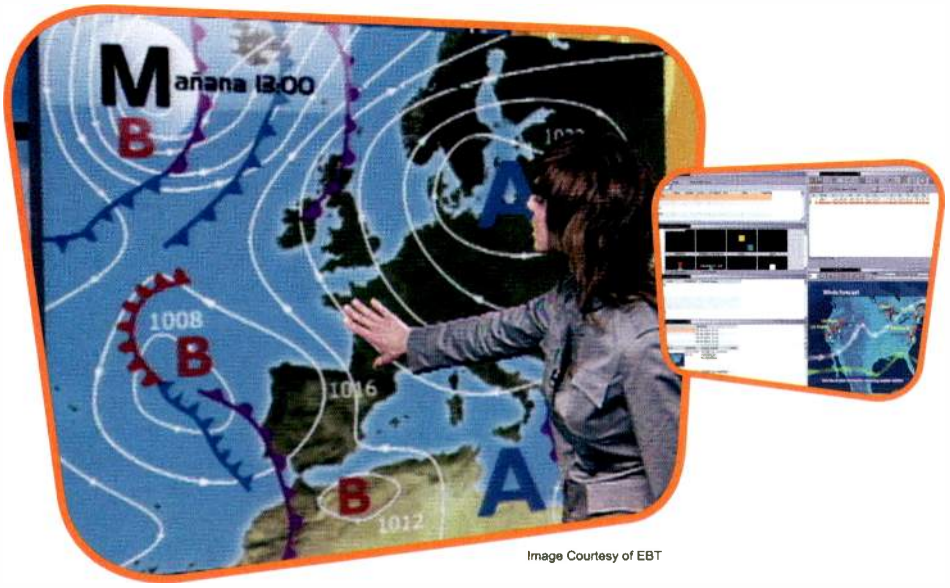

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Fast and easy to use.

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State-of-the-art 3D HD/SD graphics & animations creation using Viz|Artist powered by Viz|Engine™.

Weather data available for all types of graphics, tickers, weather presentations and virtual sets.

Supports Curious World Maps Software.

Weather symbols, 3D maps, isobars, radar maps, temperatures, wind speeds and direction displayed automatically in real-time.

Template based: Demands very little manpower to prepare a forecast ready for air.

Weather data resolution from Storm: 36km down to under 1km resolution.

Automatic (or manual) data insertion from the weather supplier into the graphics.

Creation and manipulation of the show sequence from within Viz|Weather.

Ability to control, switch, and manipulate weather data and graphics in seconds.

Preview of weather graphics is instantly available within the user interface.

Easily manipulated graphics, even during broadcast, show up-to-date weather events and locations.

Full integration of weather data in other Vizrt systems such as the Viz|Ticker™.

Sound effects.

Supported Data Types

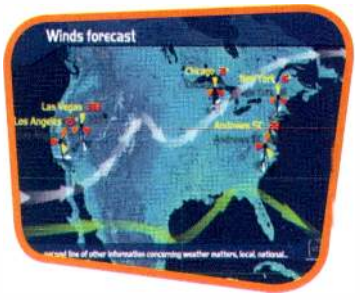
Point data: temperature, symbol, wind speed, wind direction, and any other data field.

Model data: Isobars, isotherms, precipitation, and cloud-scans.

Satellite imagery.

Radar imagery and radar forecast.
Manual input data: Fronts, pressure systems (HL), text, and splines.

Most other data can be added if needed



ardendo

Media Asset Management solutions for the Broadcast Industry. Ardendo offers a range of solutions for Digital Archiving, Ingest, Media Asset Management, Transcoding and Browse Editing. Experience in combination with technology, competence and partnerships enable Ardendo to deliver solutions for broadcasters on the move to IT-based production and archiving.

Ardendo Product range:

Ardendo offers a range of software products for IT-based production and archiving of digital media.

ARDCAP	Professional Ingest Solution
ARDENC	Browse and Thumbnail generation
ARDOME	Third generation digital media management
ARVID	Video server for archive and workgroups
BROWSE EDITING	Editiing on the desktop
DART	Digital Automated Record Tool

In addition, Ardendo also offers project implementation services: Resources for project management, solution architecture, system customisation, test and training.

vizrt

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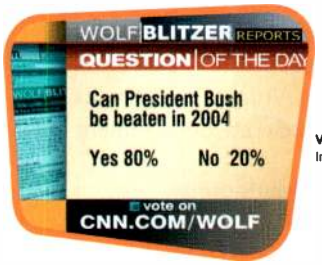
Tel: +1 212 560 0708
email: usasales@vizrt.com

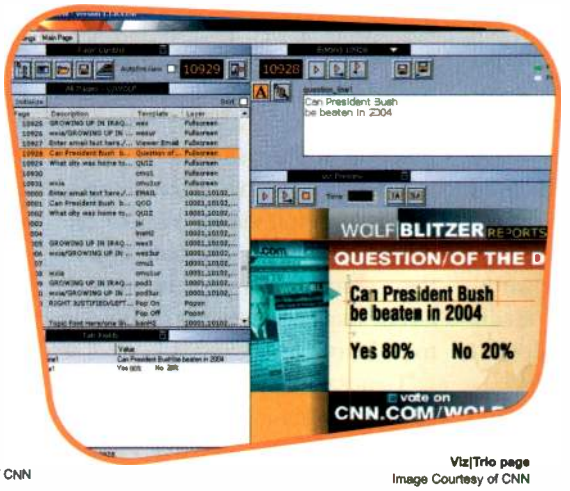
Viz|Trio™

The superior 3D renderer, **Viz|Engine™** is the output source for **Viz|Trio**

Viz|Trio is a cost-effective, yet powerful, real-time 2D/3D character generator. In addition to the basic CG features it offers a feature-rich 3D design system for creation of true 3D graphics and animations. Viz|Trio offers a wide range of attractive features such as the Look-Ahead Transition Logic™, multiple clients controlling one output channel and integration to Non-Linear Editing systems.



Viz|Trio Output
Image Courtesy of CNN



Viz|Trio page
Image Courtesy of CNN

HD/SD Output

Viz|Trio can deliver both High and Standard definition formats. Being built upon the Viz|Engine real-time output machine Viz|Trio as a software automatically supports SD and HD. The core technology in Viz|Engine is entirely resolution independent, hence adaptation to new output standards is only a hardware issue.

Key Features and Benefits

True real-time 3D graphics.

Easy-to-use feature-rich 3D design tool.
Look-Ahead Transition Logic enables seamless automatic transitions between graphics (no need for mix off/on).

Integration with the leading non-linear editing (NLE) systems from Pinnacle and Avid.

Supports all SD and HD formats.
Advanced multilayer logic reduces number of pages needed for composite graphical elements.

Client/server architecture allows multiple clients to perform off line creation, preparation and/or editing of graphics.It also allows multiple clients/operators to control the same output channel.

Optimized workflow: various screen layers, content creation and playout divided between operators.

Seamless newsroom integration with all major newsroom systems: INews, Octopus, ENPS, Dalet+, OpenMedia, Pronews, and other systems which supports MOS Newstar. Intelligent Interface™ support and powerful native API.

Runs on standard, rack mountable PC hardware and laptops.

Intuitive GUI with WYSIWYG display of graphics, without use of the on-air playout unit.

Four independent video input sources, 2 built-in clip channels with playback of DVCPRO25 / DVCPRO50, and MPEG-2 clips. Clip playout can be controlled from the animation timeline. as well as multiple real-time video output with adjustable video buffering.

Local (VGA) and external (SD/VGA) preview channels (multiple configurations available).

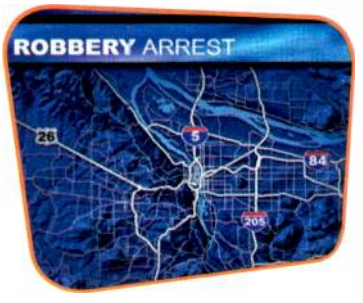
Import of 3D objects from: Wavefront™, 3Dstudio™, Autocad™, VRML 2.0™, Maya™, and Softimage|xsi™ as well as import of Softimage|xsi animations.

Still store/Image/Clip/DDR database with search functionality.

Built-in 2D DVE with sub pixel accuracy, RGBA Input, and Chroma Keying.

Viz|Curious World Maps™

The superior 3D renderer, **Viz|Engine™** is the output source for **Viz|CWM**



Design, Produce, Present

Curious Software introduces its new 'Design, Produce, Present' workflow built around the award winning Viz|Curious World Maps, and a new Viz|Artist and Viz|Engine integration.

Design- The workflow starts with the creation of templates in a new authoring environment incorporated into Viz|Curious World Maps. Using the full design capabilities of the industry standard system, your graphics team creates templates specifying exactly how every map will look: the style, the selection of aerial or satellite imagery, the level of detailed street data and so on...Pre-rendered animations or high resolution still maps can also be created to make the final production even faster. If you don't have a graphics department, Curious Software can even create your templates for you.

Produce- Use the Viz|Curious World Maps Templates to create your story telling maps - expanding map creation beyond the graphics department into the newsroom and studio,directly within the control of the news and program producers and directors. Each product in the Producer range is entirely dedicated to fast and easy creationof maps illustrating particular types of story. They are designed to be used by non graphics professionals - allowing editors, journalists, producers or presenters to create and present still and animated maps of the highest broadcast quality.

Present- Using Viz|Trio, Viz|Content Pilot or Viz|Weather, it is made simple. No need to copy heavy animation files to a DDR, simply save the template as a numeric page into the rundown (Trio, Pilot or Mos playlist) and "take to air" upon the directors cue.

properly, it can have minimal impact on newsroom workflow.

"Generally speaking, file-based workflows are innately suitable for repurposing," Casaccia says. "At that level, the repurposing target is a non-issue because what's going to happen is somewhere in the process, you are going to customize the media for the delivery method — the old concept of COPE (create once, publish everywhere)."

According to Casaccia, the workflow in creating the prime media for the initial distribution doesn't need to change.

"What has to happen during that workflow is at the appropriate points when identified by the appropriate people, hooks or flags have to be put on the material to say, 'From this point to this point — a mark in and mark out, if you will — this area of this media is going to be repurposed in the following one or more ways,'" he says. "Right from that point, you start creating associations."

Those associations don't have to be confined to audio and video essence but can include graphics, titles and other pertinent production elements.

"What you wind up doing is tasking the metadata system more than the primary essence file delivery system," he says. "You need to add descriptors that are durable. How they are used downstream is determined by the medium. To enable really facile, elegant, efficient repurposing is actually almost entirely a function of the metadata."

Building original, new stories for distribution via the Web or cell phone may be the ultimate step in the broadcaster-to-content-producer makeover, but it's also the most involved.

"Generally, when you go out and shoot footage for a story, you might have a 30-minute tape that's full of great footage," Howard says. "You probably used about 15 or 20 seconds of it during that 30-second story (on-air). So, there's a lot of content there that you're already paying someone for. What you need are the tools that really enable you to use that content when it's new and fresh and not as an afterthought."

At WRDW-TV in Augusta, GA, editors and photographers use the Avid NewsCutter system for more involved pieces (shown), while reporters and producers edit simpler stories from their desktops with Avid iNEWS Instinct editing stations.

Cell phones and mobile TV

At the same time stations are tweaking their workflows and editorial choices to support a greater presence for their news content on the Internet, cell phones and mobile TV devices are entering the picture as viable news delivery platforms.

The potential for this market is significant. A report released in September from Juniper Research forecasted about 120 million mobile users in more than 40 countries will receive broadcast television content by 2012. While the figure stands at fewer than 12 million worldwide today, in five years that swelling number of users will spend more than $6.6 billion on mobile broadcast television services, the research organization says.

An alliance of U.S. commercial and public broadcasters, called the Open Mobile Video Coalition, is working to accelerate development of a mobile TV standard for broadcasters. The Advanced Television Systems Committee has shifted the standardization process into high gear, calling for and receiving multiple proposals for a mobile and handheld standard.

Metadata is critical to thriving in a three-screen news world. The Thomson Grass Valley Aurora news production system can pull assignment metadata from the newsroom computer and send it to an Infinity camcorder in the field.

The urgent desire for a system that would allow local stations to use a piece of their 6MHz wide DTV channel to deliver mobile TV is so strong that two systems — MPH from Harris and LG Electronics, and A-VSB from Rohde & Schwarz and Samsung — may even compete in the free market

SONY

"Because the F350 has time lapse, slow shutter and over and undercranking, I got more creative options and my client got higher production value for the budge," Humeau says.

"With XDCAM HD, we shot a big show on a tight budget."

Thierry Humeau, director of photography and president of Télécam Films recently used his PDW-F350 XDCAM HD camcorders to create *Bombs, Bullets & Fraud*, a documentary on the US Postal Service Inspectors for Smithsonian Networks, a new HD TV channel from Smithsonian Institution and Showtime Networks.

"They needed a big movie that had to meet their high standards of quality on a fairly tight budget," Humeau says. "Some scenes we shot movie-style with a big crew, dollies and jibs. Some are ENG-style, following cops at night. Some are highly produced interviews. In every instance, the XDCAM HD camcorder came through."

The show's producer, Tim Baney of Baney Media is also a fan. He says, "The camcorder is very producer-friendly. You can instantly play back a scene on the LCD monitor and say okay, good, let's move on to the next take. It's a huge time saver and safety net that gave me confidence, knowing we got it in the can."

And the Smithsonian Networks' reaction? "They love it," says Baney. "In fact, they're already talking to us about another film."

To see a trailer of Bombs, Bullets & Fraud and find out how to receive up to $500 back on the purchase of an XDCAM HD camcorder, visit **sony.com/xdcam**.

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Smithsonian NETWORKS

before the ATSC standardization process has run its course.

Those responsible for charting the future path of broadcast and news operations are taking this market extremely seriously. For example, The E.W. Scripps Company is conducting engineering studies to determine whether it might be possible to enhance delivery of a mobile TV broadcast signal, says Bill Peterson, senior VP for the E.W. Scripps Company television station group. The studies seek to find out if "adding a vertical polarization to new antennas that we install" would allow "good home reception as well as good reception off a handheld device," he says.

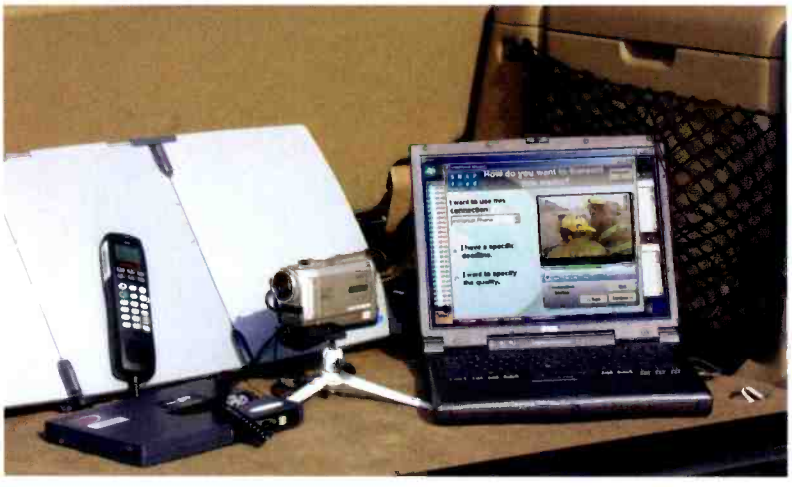
Neither Scripps nor other broadcasters are waiting for the ultimate direction a broadcast mobile TV standard takes to begin offering content to viewers on the go.

"We are introducing video to mobile devices in most of our properties in the near future — real near future," Peterson says.

One approach is via cell phone, and a major avenue onto those handsets is News Over Wireless, a network of mobile solutions that provides coverage across 85 percent of the United States. The company, which belongs to Capitol Broadcasting Company's CBC New Media Group, offers a way for broadcasters to use wireless Web, Java, video and SMS services to distribute their content to cell phone subscribers. So far, the company has signed agreements with 25 station groups, including CBS Television Stations, Gannett Broadcasting, Lincoln Financial Media and Media General, to assist their stations in reaching mobile handsets.

On the other side of the coin, today's handheld devices can play an important role in news contribution. That's the thrust of the new ENPS Mobile Suite introduced at IBC2007. The system consists of three components: the ENPS Mobile application; a Web-browser version of the ENPS desktop known as ENPS Web; and SNAPfeed, a Pocket PC version of AP's store-and-forward video application.

"The SNAPfeed Mobile Client makes every staffer that you want to give a device to a newsgatherer," says Joe Webster, manager, marketing technology for AP Global Broadcast. "For those situations where you need to turn your handheld device into a newsgathering tool, you can capture audio, video and stills and using the same kind of SNAPfeed workflow that's in place with the full SNAPfeed client, transfer content to your station's server."

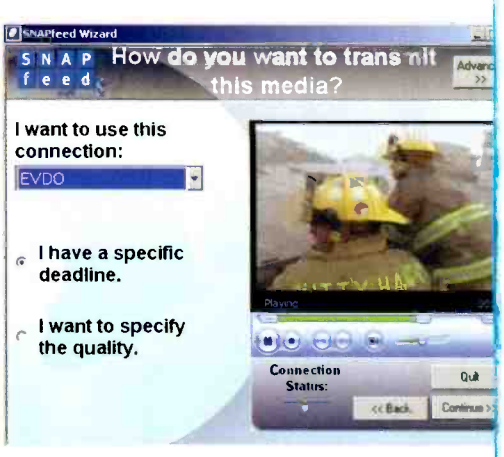


Within the past month, the Associated Press introduced a Pocket PC version of its SNAPfeed store-and-forward video application, which previously was only available as an application for a laptop.

Be true to the medium

Broadband Internet service and cell phones have emerged as new media faster than many imagined and left television station news operations scrambling to figure out what's the best approach to take.

Certainly, the transition from linear tape-based news production to file-based workflows has positioned TV newsrooms to seamlessly create content for these new digital outlets. But that's the easy part.



The SNAPfeed interface makes it easy for journalists in the field to contribute footage to an ingest server in an ENPS newsroom via a standard IP network connection.

Far more difficult is figuring out what kinds of news content will best serve the needs of the news consumer at the receiving end of these new delivery platforms. How long should a story be? How should it be told? What's the best way to use graphics and titles? How can news stories on these platforms best use their interactive element? Those and scores of other questions must and will be answered as the use of these new media for news consumption unfolds.

In this sea of uncertainty, one thing seems clear.

"The one lesson that has come out of all of this is whatever you do has to be true to the medium," Peterson says. "Whatever you do has to be authentic for the medium." ◀

Succeeding on new platforms

Find your unique value, says ABC News senior VP newsgathering

Television news is in a period of advanced change, and the broadcasters who succeed will be those who identify the unique value they bring to new distribution platforms such as broadband and mobile devices, says Paul Slavin, ABC News senior VP newsgathering.

Slavin, who will deliver a keynote speech during the *Broadcast Engineering/Broadcasting & Cable* News Technology Summit in Chicago, contends that the delivery of video via these platforms is the future of news. But beyond that, there's uncertainty about how best to leverage video, text and audio to win over news consumers online and on-the-go.

"How do we create content that is compelling on a small screen?" he asks rhetorically. "How do we create content that someone has to aggressively go and get — either by searching for it or downloading it — as opposed to just passively accepting it? How do we create a different relationship with our users?"

While Slavin, along with the rest of the television industry, searches for the answers, some general principles are emerging. One is to avoid producing subtle stories for mobile phone viewing.

"Stories for mobile phones have to be broader brush," he says. "They have to use simpler graphics, and the pictures need to be more apparent. You can't be looking for subtle imagery that you might see in a '20/20' piece."

Another principle is the role of news personalities.

"News personalities are the stock and trade of what we do with a traditional broadcast," Slavin says. "Programming for the mobile device has different needs."

Paul Slavin, ABC News senior VP newsgathering, says that the delivery of video via broadband and mobile devices is the future of news.

Applying a bit of intelligence to packaging stories for various distribution platforms is another.

"There needs to be an acknowledgement going into the process that you have to take the same content and cut it up into different bits and pieces for a different demographic and a different technical platform," he says. "There may be a very small expenditure to do so; there may be none whatsoever, except for the expense of intelligence."

There also needs to be a fresh look at how field footage is acquired to feed the need for more news content.

"I think we may be really adapting a lot of what the local level can already do," says Slavin. "There are simple things, like the question about the number of crew members that can go out on a shoot. At local stations, sometimes the reporter carries a camera, and sometimes it's a one-man band. It is rarely two people."

At the network level, sending two- or three-person crews into the field warrants a fresh look.

"We need to be more intelligent about the use of our own resources," he says. "We need to ask people to be multi-talented. We need to teach people to shoot and edit and report and even broadcast."

During this transitory time as TV news operations look for the best ways to capitalize on their strengths and new audiences, having the freedom to experiment is critical, Slavin says.

"We are trying 100 different things to see what sticks," he explains. "You have to be willing with each of these technologies moving forward to fail. You have to be structured for failure. Things will not work. But if you don't fail routinely, then you're never going to succeed occasionally."

That's not to say there isn't intense competitive pressure to succeed. The same broadband technologies making the Internet a viable new delivery platform for the television industry are allowing non-traditional video competition.

"There was a time when I first came to the business that the competition was CNN, CBS and NBC," Slavin says. "Now my competition is everybody. What do you do with that? You continue to look for differentiating technologies and content. You look for those things you can create a remote around. You have to get smarter about marketing and smarter about everything because now I am competing with the newspaper in Des Moines." ◀

Work faster and smarter with Avid Interplay

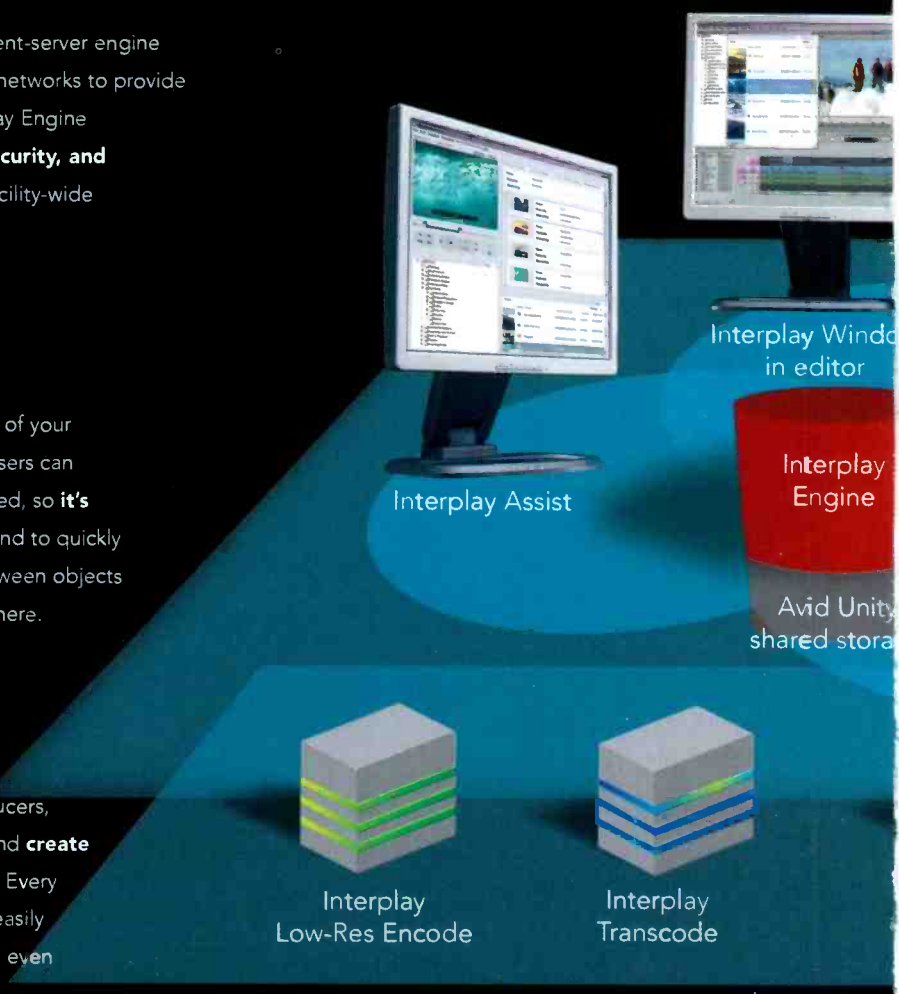
At the heart of the Avid Interplay system is a client-server engine that works with the Avid Unity™ family of media networks to provide instant access to your media assets. The Interplay Engine provides **powerful search, revision control, security, and media management** capabilities in a unified, facility-wide media production environment.

A deep database with a friendly face

The Interplay Access client offers multiple views of your media, organized the way people really work. Users can quickly see how elements or assets are connected, so **it's incredibly easy to find shots and sequences** and to quickly pinpoint all related material. If relationships between objects change, they are automatically updated everywhere.

The right tool in the right hands

With the Avid Interplay Assist application, producers, assistants, and others can log incoming feeds and **create sequences without tying up editing systems.** Every level of user—from assistant to producer—can easily add locators, enter descriptive annotations, and even use shortcut keys to insert shot descriptions.



Save time at the very start

Interplay Low-Res Encode creates low-resolution versions of incoming footage simultaneously with the high-resolution capture. Automatic encoding of the same asset in multiple resolutions saves time, frees editing systems to do production work, and ensures that **every user is working with the most efficient, best-quality material.**

The resolution you need, automatically

If an editor needs either a high- or low-resolution version of a media asset, the Interplay Transcode service can be **triggered from within the editing interface.** The correct resolution is created in the background and made instantly available. When a sequence is sent to a playback device, all material is automatically re-linked to the target resolution.

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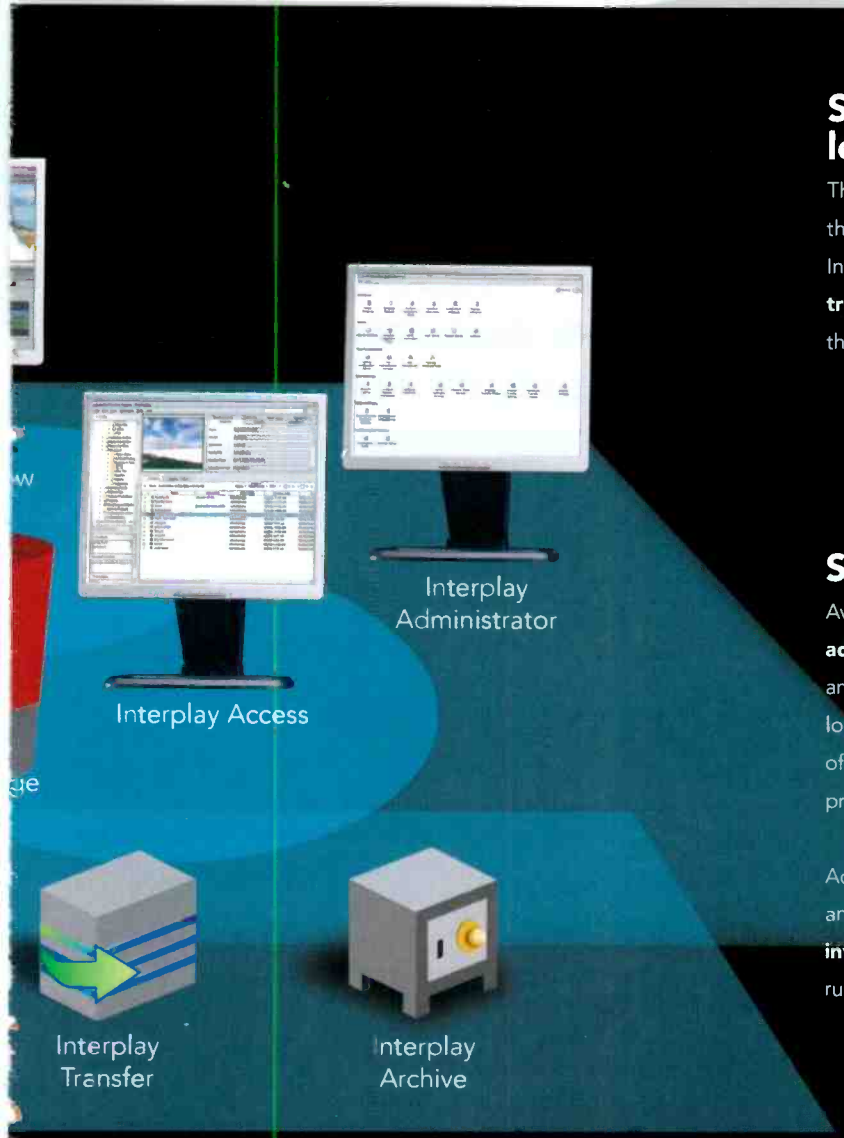

See the whole field without leaving the editor

The Interplay Window is directly accessible from within the latest Media Composer®, NewsCutter®, iNEWS® Instinct™, and Symphony™ Nitris® systems for a **transparent connection to media assets** through the Interplay Engine.

Stay safe and sound

Avid Interplay Administrator offers **flexible, secure administration of Interplay software,** user access, and workflow. Health monitoring and diagnostic logging capabilities let administrators view the status of all Interplay components, including system hardware, processes, processor utilization, and disk status.

Additionally, expert planning, certification, training, and testing from **Avid Total Services protect your investment;** ensure that your personnel get up and running quickly; and provide a faster ROI.

Keep working while you move media

The Interplay Transfer option manages processor-intensive media transfers so facilities can exchange media of any type with other workgroups, locations, and third-party systems. **Quickly transfer media and metadata in the background** without interrupting editing and production work.

Keep everything within easy reach

Editors and Interplay Access users can quickly archive media using the Interplay Auto Archive™ feature. Intelligent tracking of archived material allows users to **work with low-resolution proxies of archived media,** automatically restoring just the parts needed for final output.

It's easy to predict the future. Deadlines will be shorter. Projects will be bigger. Competition will be tougher. Don't fight tomorrow's battles with yesterday's tools. Avid® Interplay™ is changing the way people work with digital media—and changing the rules of the game—to give you a real competitive advantage: more time.

A powerful set of desktop tools and network services automates routine tasks and accelerates turnaround at every step, from preproduction to final delivery to archive. That means more time to be creative. Less time spent on busywork. And a more efficient business operation that leverages the full potential of your team's talent and technology.

For more information visit www.avid.com/interplay.

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do more™

For election night 2008 coverage, many local stations are considering new approaches to graphics already used on the network level, including the immersion of news anchors and analysts into news graphics, says Isaac Hersly, president of Vizrt Americas.

News graphics evolve

As newsrooms adapt for HD and content delivery to cell phones and PCs, graphics keep pace.

Developments in television news graphics are keeping pace with the other sweeping changes affecting news workflow, formats and delivery options.

Driven by the desire to maximize efficiency, control costs and guarantee a consistent level of quality, some station groups continue to implement a centralized graphics workflow. For instance, Media General Broadcast Group announced in August that it was adopting a centralized graphics workflow headquartered in Richmond, VA, for its news, marketing, sales and special projects departments at its 23 network affiliate TV stations. Relying on a template-based graphics workflow, Media General expects to complete the transition by the end of the year.

The march towards HD newscast also is affecting stations as they grapple with creating graphics for a dual standard- and high-definition audience. Some, such as CNBC HD and the soon-to-launch Fox Business Channel, are even looking at ways to move beyond the center-cut-with-wings-attached format to take advantage of new ways to configure their screen real estate.

New approaches to TV graphics for the small screen — cell phones and mobile devices — as well as the station's Internet sites, are also emerging. Add to these the way stations will handle election graphics in 2008, and it's clear the TV news graphics will remain a dynamic sector for the foreseeable future.

Acquire and interact

Data acquisition technology that allows newsroom graphics systems to collect vote totals from election reporting services and automatically generate graphics based on the numbers is a mainstay of election night graphics. However, even this mature technology is being tweaked and improved.

"We are always finding ways to get data into our system faster," says Isaac Hersly, president of Vizrt Americas. "We also are seeing that more of this data can be previewed first and then viewed on desktops within the newsroom systems."

These new preview capabilities give producers responsible for races the ability to look at the results close to real time.

"They can set that up and enter it into the playlist," Hersley says, "so the production tools have a higher value now, and the content can really be previewed before it goes to air."

More appealing election graphics are also headed for local stations

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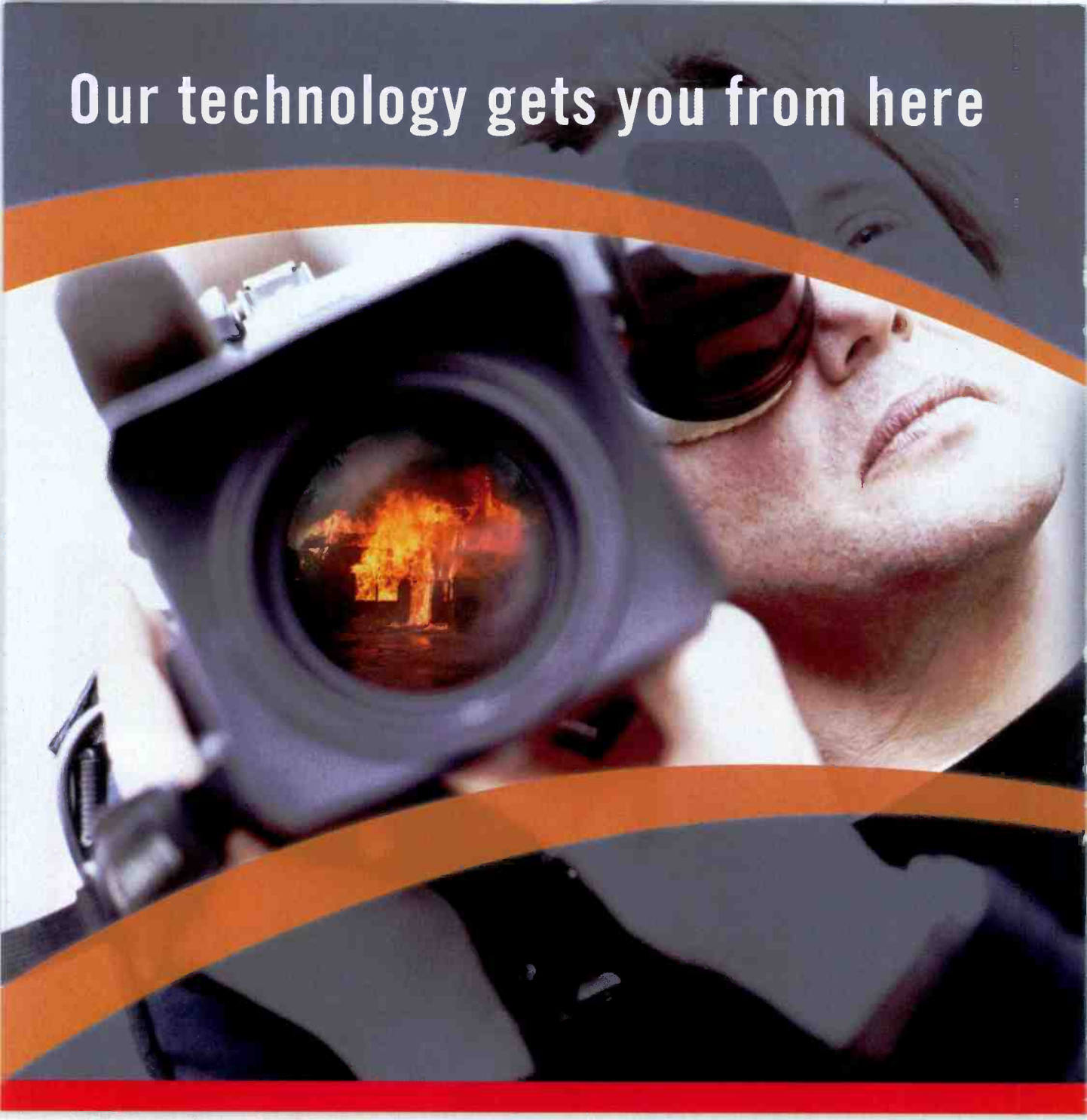

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according to Hersly.

"The networks have always had the infrastructure to create a sophisticated line of graphics," he says. "Now, the smaller local stations — with local news revenue being so important — are upgrading to be able to present sophisticated graphics."

Local stations are looking to add interactivity with their election graphics that will allow anchors and reporters to call up race results, do comparisons and visually demonstrate election scenarios with the simple touch of a flat-panel display or video wall, Hersly says.

Vizrt's multiplatform suite MPS uses the native processing power of Web visitors' computers to generate news graphics on the fly.

"They can use a standard touch screen, which can be mounted over a standard flat-screen monitor," he says. "We can assist them, train them or show them how they can set up interactivity on that screen. It's real easy if you think about it. Instead of using a mouse click at your desktop, you are using your finger by pointing and clicking and causing a reaction or an interaction on the screen."

Interactivity is consistent with a broader trend Vizrt has identified, he explains.

"Most of our clients feel that the anchor or the anchors should now be embedded within the graphic to tell the story, so there's no cut-away to a full screen of graphics," Hersly says. "The anchor is still somewhat in your face, which is a good thing because a lot of folks like that personality delivering the information and whatever graphics accompany that story."

Mobile TV, the Internet & high definition

As television newsrooms have gotten serious about delivering content to cell phones, handheld devices and the Internet, graphics vendors are responding with ways to help them carry over their on-air look to these new platforms. For example, Vizrt last year unveiled its MPS multiplatform suite, which lets broadcasters take advantage of the computing resources in the hands or on the desks of consumers to achieve that consistency.

However, it's been slow going on the cell phone front for MPS because "the performance of the phone networks in this country is not where it should be," according to Hersly. However, recent announcements of cell phones with on-board graphics mean help is on the way. Even today's cell phones can handle the difference between's the horizontal aspect ratio of TV and their own vertical orientation.

"Remember, there is code running on these mobile devices," says Ed Casaccia, director of product management & marketing for Thomson Grass Valley Digital News Production. "They are not like a television set that's just a receiver. So, in your delivery you can become much more agnostic by sending the same thing everywhere but telling each device how to display it. If you send the same data every place but you tell the device, 'Here's the crucial area of interest,' we have the technology to define the area of interest and pass that along as data so that a phone with a vertically oriented aspect ratio can know what to do."

Graphics-rich PCs are a different story entirely. Millions already have the graphics processing power on board to generate on-the-fly news graphics sent as data along with a station's video stream via the Internet.

"We have a version of our software that puts our Viz engine in a PC and lets us create graphics locally, and those graphics can be targeted to known consumer preference," Hersly says.

On the big screen side of the equation, the growth of HD graphics systems deliveries in the United States is tracking the increasing number of local stations on-air with HD local news, which currently is estimated to be between 50 and 60 stations. According to Hersly, 85 percent of the Vizrt graphics systems being shipped today in the United States are high definition.

Vizrt's MPS client for cell phones and handheld devices will become more important as on-board graphics chips are added, says Isaac Hersly, company president for the Americas.

"We are finding that local stations — be it in the top 10 markets or even the top 50 markets — most of them when they do order today are asking for HD, and it's not that they were planning to do it down the road," he says. "It's a relatively immediate use of HD."

According to Hersly, stations are adapting well to HD's wider aspect ratio and the need to simulcast standard- and high-definition channels.

"We are not having too many issues vis-à-vis SD and HD graphics, once they get the hang of it," he says.

NewsCat

An integrated news cataloguing and archiving solution.

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Manage the Growing Amount of News Content

As facilities move to a tapeless workflow with nonlinear editors and video servers, it's important to have a system in place to store news stories without the time consuming process of dubbing to videotape. Crispin's NewsCat digitally archives stories after airing and provides a method to easily locate material at a later date. Archived video clips are linked to a database containing all script information from the newsroom computer system. The database functionality includes an extensive search function; producers and editors can search for a story using traditional parameters such as date, slug, script information or keywords.

Optimized Workflow

NewsCat enables broadcasters to optimize their facility-wide workflow through an interface resembling an Internet search engine. Multiple users can simultaneously search and retrieve archived video from anywhere on the Intranet.

Video Storage Designed for a Newsroom's Workflow

Most television news departments require that the most recent (3 - 12 months) news video be availab e almost instantly (nearline storage) and that the remaining news library be accessible within minutes (shelf storage). Crispin's NewsCat has the flexibility to scale the size of the nearline storage to meet the needs of both large and small newsrooms.

Create Stock Footage Libraries

News departments always have the need to locate generic file footage to use in a story. The unique annotate feature in NewsCat allows a news department to add key words and descriptions to archived video enabling producers to quickly locate file video.

No Software!

All user interfaces are seen using a standard browser such as Internet Explorer. Any networked PC in the news department has access to NewsCat searches...no dedicated terminals of software needed for users!

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Measuring TV audience

Four factors will impact local news ratings, says Nielsen Media Research's chief research officer.

The next couple of years are likely to be the most dynamic in the history of television measurement, says Paul Donato, chief research officer at Nielsen Media Research.

Donato, who will discuss those changes at the *Broadcast Engineering/Broadcasting & Cable*-produced News Technology Summit in Chicago, identifies four unfolding changes which are likely to impact local news ratings.

"Our most important initiative is probably the combined measurement of TV and the Internet," Donato says. "That includes measurement of streaming but also measurement of viewing Web pages."

Over the next year, Nielsen is rolling out measurement techniques designed to reveal the relationship between broadcast and Internet use.

"So many of the major station groups have come to us and talked about their Internet strategy and the interplay between whether their news programs can push somebody to a Web site, and whether a Web site can drive somebody to an actual video," Donato says.

The extension of electronic measurement techniques down to market 125 is another significant change, he says. Rolled out over the next three to four years in markets 11 through 60, People Meters will have the same impact in these markets as they have had for some time in markets 1 through 10, namely the elimination of sweeps and a change in the size of the measured audience.

"It's year-round measurement, so there are no more sweeps," Donato explains. "To the extent there's any kind of programming done for the sweeps periods, People Meters will likely impact that strategy."

Paul Donato, chief research officer at Nielsen Media Research, says that over the next year, Nielsen is rolling out measurement techniques designed to reveal the relationship between broadcast and Internet use.

History also shows there are differences in the numbers that get produced when measuring a person's data through a People Meter versus a combination of meters and diaries, which is the technique currently used in markets 11 through 60.

"Typically, any programming that runs five days a week at the same time tends to do better in a diary than a pure electronic measured system," Donato cautions.

For markets 61 to 125, Nielsen plans to mail households electronic meters to measure their viewing habits. All it asks is for people to place the devices near their TVs so they can pick up what it being watched.

"What that tends to do compared to an all-diary system is to actually drive the ratings up a little bit," he explains.

The bottom line for news directors is simple.

"Technology changes result in measurement changes," Donato says. "Sometimes you can expect them to have a positive impact on the numbers, and sometimes they'll have a negative impact on the numbers."

Nielsen also will begin relying on new technology that looks for codes embedded in audio tracks rather than what frequency is tuned to in its quest to measure the out-of-home TV viewing market.

"By measuring television that way, you're in a position actually of measuring mobile media outside the home," Donato says. "No longer does the meter actually have to be attached to a TV set. From a news programming point of view, it's a fact that much news is broadcast during traditionally what is the commute time."

With this new approach, Nielsen has a way to measure viewers who are turning to mobile devices during their commutes, a previously unmeasured, but important, segment of the total audience.

Finally, there will be a growing use of data from STBs. By providing data about what's being watched on a second-by-second basis, STBs give news directors the ability to do micro evaluations of their newscasts. While acknowledging limitations — such as not knowing whether the box is attached to a TV that's actually on — Donato says set-top box data is precise.

"Taken together, these are tremendous technology changes to the whole ratings system," he says. "They are likely to have a significant impact on news audiences and, therefore, the management and production of news." ◀

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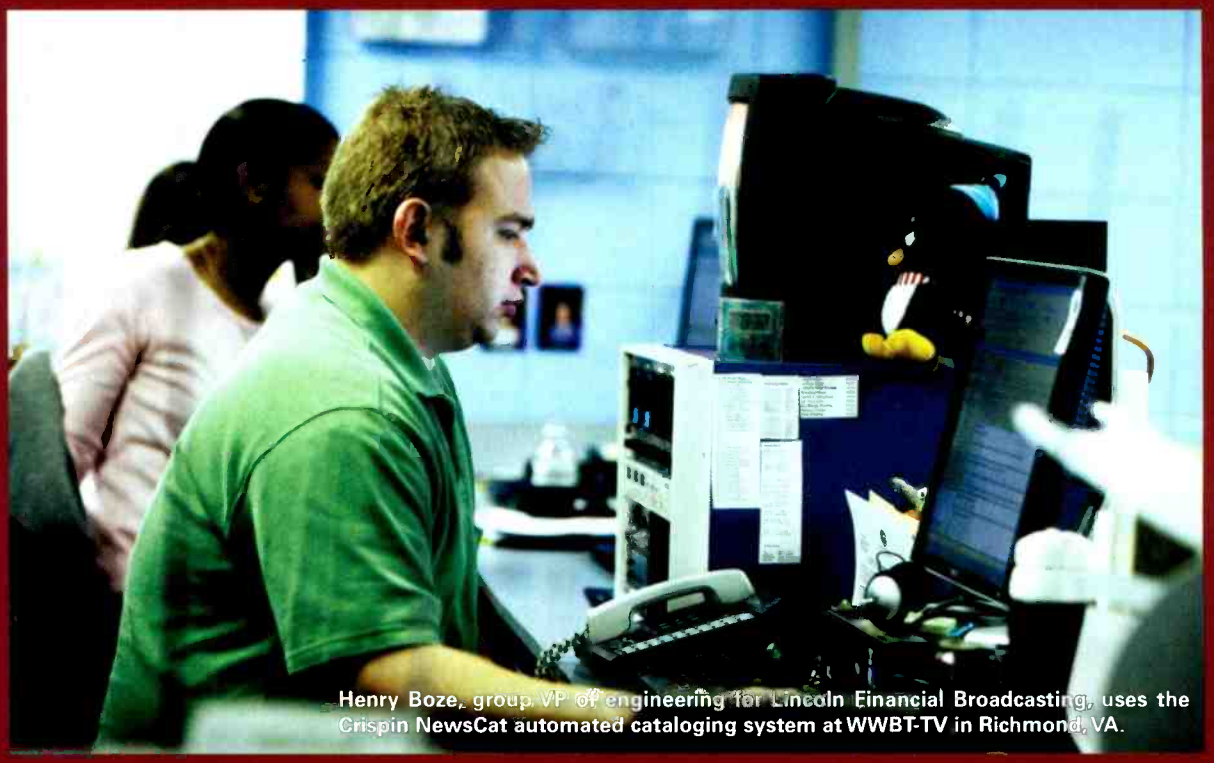

Henry Boze, group VP of engineering for Lincoln Financial Broadcasting, uses the Crispin NewsCat automated cataloging system at WWBT-TV in Richmond, VA.

Maintaining a competitive edge

News operations will have to find efficiencies through file-based workflows and automation.

The Internet is developing into a great homogenizer when it comes to news media. Once easily defined media types, like television and newspapers, are adopting and adapting the tools and techniques of each other to produce Web presences that blur the line of demarcation that once separated the two.

Television station Web sites abound with wire service copy and locally generated, inverted pyramid-style text stories, just like those found in daily newspapers. Newspapers too have adopted the stock and trade of their rivals, adding video coverage as a prominent feature to their Web sites.

A study of newspaper Web sites released in July from The Bivings Group revealed that 92 percent of the top 100 U.S. newspaper Web sites now offer video — up from 61 percent the year before. The study also found that 39 of those newspapers are originating their own video content for distribution on their sites.

That news should set off alarm bells throughout TV newsrooms across the country, particularly when the number of reporters employed by both institutions gets factored in.

"If you look at the ratio between newspaper reporters and TV reporters, it could be as many as 20 to one," says Johnathon Howard, Avid Technology director, Broadcast and Media Publishing. "The important thing to keep in mind is television newsrooms need to get out in front of this right now.They have the talent pool that knows how to crank out a lot of content. They also already have the infrastructure in place."

That infrastructure, supported by file-based workflows and automated news production, can help stations equalize the numerical advantage of their newspaper competitors.

"If you plan for it and put the right tools in place right now, there's still time," Howard says.

File-based workflow

By now, the benefits of file-based workflows in TV news production are well established. Such approaches are faster and easier to use than linear videotape methods. Multiple copies of the same content can be viewed and edited by reporters, producers, editors and the promotions department at the same time.

"That's the beautiful thing about the technology," Howard says. "Since everything is basically file-based now, that means that you can get access to content as soon as it exists."

Even though videotape still plays an important role in television news production, the preponderance of

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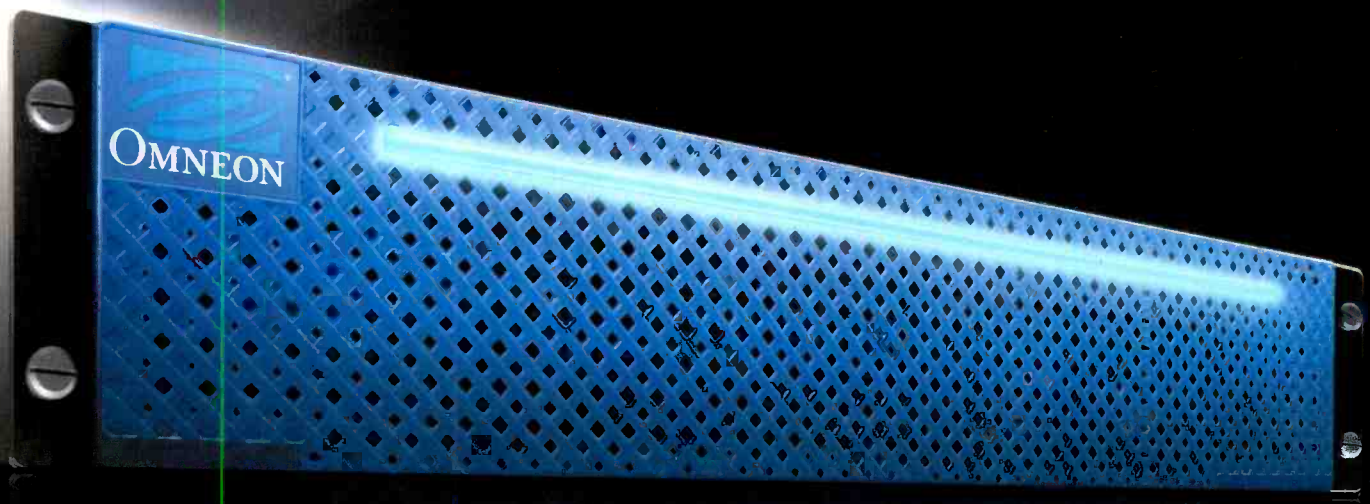

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new tapeless camcorders seems to foreshadow tape's ultimate demise.

As Chris Lee, former news director of KRON-TV in San Francisco and current senior director, broadcast solutions for Omneon Video Networks, says, "The new acquisition formats all capture file-based material, so now more than ever you really want to have a server at the hub of your production facility. Otherwise, you are in a very awkward position of taking this sleek file-based material and then dubbing back to tape to edit, which really just costs everyone time and really makes no sense."

At WPEC-TV in West Palm Beach, FL, the Ross Video OverDrive news production automation system improves efficiency and enhances the on-air look of the station's newscasts.

A file-based workflow also can produce a few benefits that are so commonplace that they may be easily overlooked. One is fostering a collaborative work environment, whether it's among reporters and producers in the same newsroom or separated by hundreds of miles in remote bureaus.

"We are bringing new approaches to multiple stations in a group," explains Quantel CEO Tom McGowan. "We've done some work with two stations to allow editors in Bryan, TX, to edit material at a sister station in Waco."

The Quantel solution also is being used at TV2, Norway's largest commercial broadcaster, with operations in Bergen and Oslo. The approach allows editors in either location to populate their timeline with source files in either location and play it out with no delay as if it resided on the server next door, he says.

Ultimately, McGowan envisions a day when seamless collaboration between remote sites will be measured in thousands, not hundreds, of miles.

"We are working on handling New York to L.A.," he says, "so editors can work together without a noticeable difference in clips on the timeline."

Another closely related benefit is news contribution and transport.

"Even in the early days, prior to the more recent wide-scale adoption of nonlinear technology, the store-and-forward delivery of affiliate news service content allowed stations to receive a huge volume of material without dedicated staff and equipment to 'roll on the feed,'" explains Rick Young, Pathfire VP of product management. "In those days, the only way to hand video off to downstream systems, which usually were tape decks, was via baseband video. Today, both the video along with the associated metadata — and you can't underestimate how important that is — can be directly integrated into workflows without the decode/re-encode process."

Data about the data

Sometimes referred to as data about the data, metadata is the "who, what, where, when, why" of a file-based workflow. It's essential because it describes individual clips so file-based systems can be searched and journalists can locate what they need. However, it raises a particularly troublesome question for journalists whose job is to get a story on the air: Who's going to enter all this data?

"I think there's a reluctance to have any tool slow you down," Howard explains. "Quite honestly, unless your job is to annotate and log footage, you are not really going to want to do it."

Thus, incorporating metadata into news production can't disrupt the newsroom's core mission.

"The trick is for the newsrooms not to have to change what they do," explains Ed Casaccia, director of product management & marketing for Thomson Grass Valley Digital News Production. "The trick on our side of the industry is to harvest that work they are doing already and associate that as soon as possible with the audio, video essence material."

Thomson does so with its Infinity camcorder and Aurora newsroom production system, he says.

"The Aurora newsroom production system can pull assignment metadata from the newsroom computer system and send it to the camcorder in the field," Casaccia says.

At that point, metadata is associated with the essence without burdening the reporter in the field.

According to Howard, Avid Technology has taken a similar approach.

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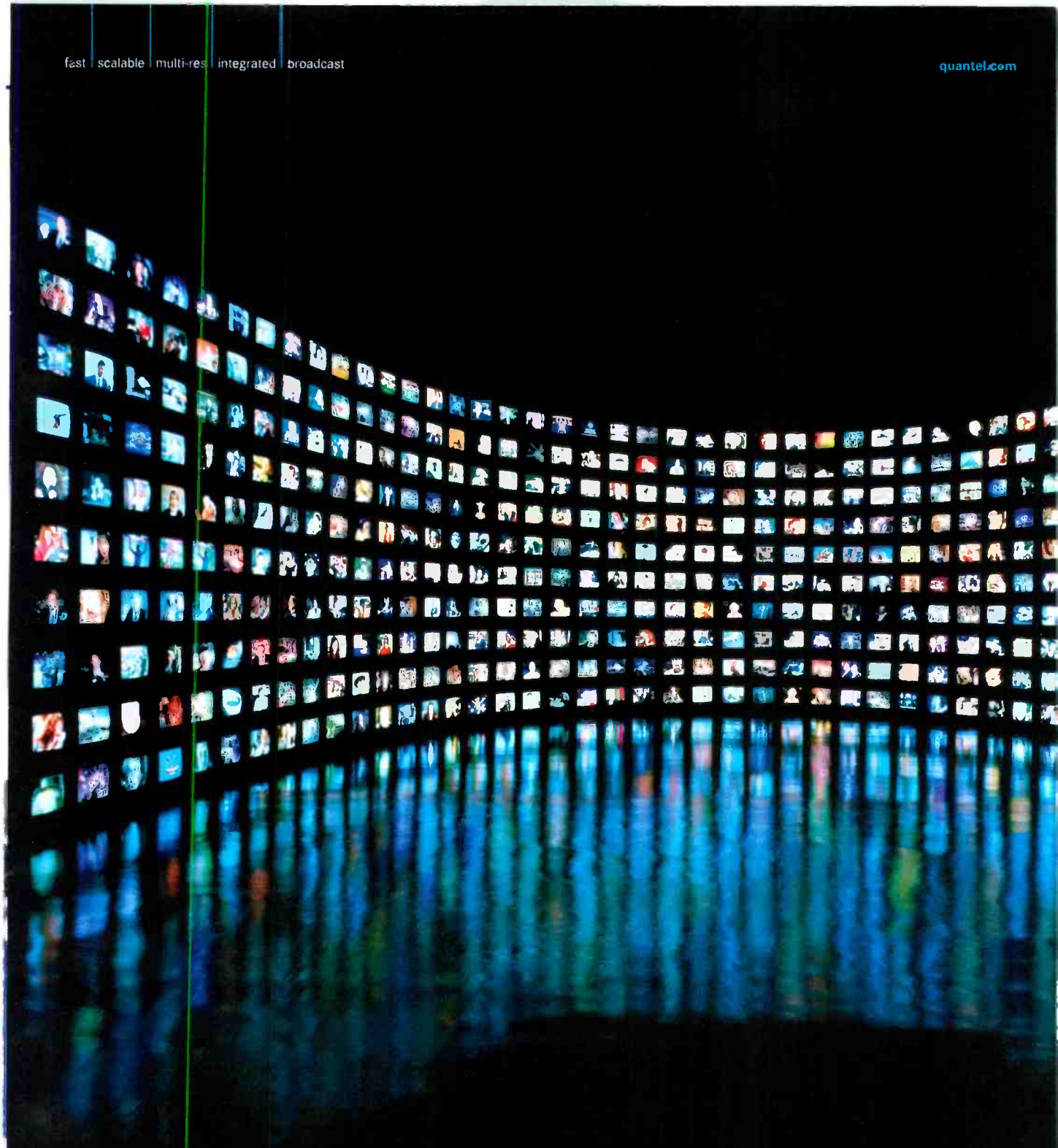

A growing number of broadcasters are taking advantage of Quantel's unique HD/SD technology

Broadcasters the world over are turning to Quantel's Newsbox HD and Enterprise solutions to improve workflows, enable higher story counts, maximize productivity, and increase revenues. Quantel integrated, HD/SD Enterprise solutions enable broadcasters to uprez SD file footage to HD while simultaneously ingesting, editing (mixed resolutions on the timeline) and playing out in either or both resolutions. New media and multi-casting opportunities await broadcasters, and Quantel's people, technology and services are there to help broadcasters meet their objectives.

Quantel – technology that means business

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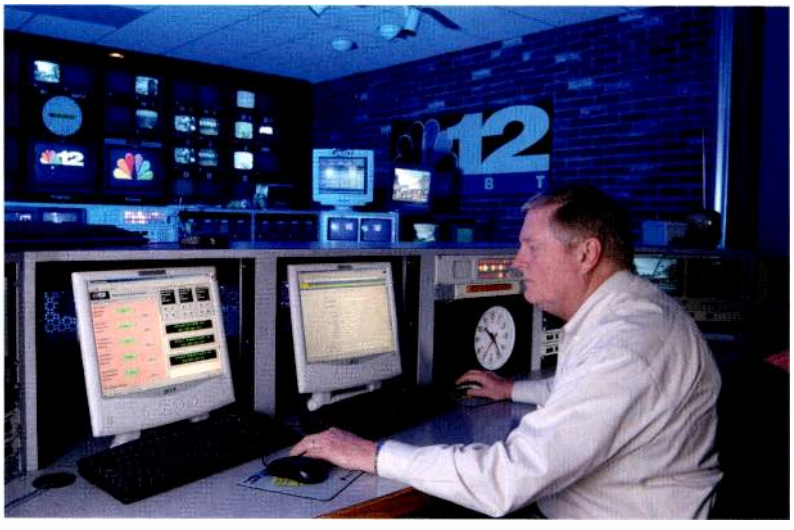
"What we've done is extract as much of the metadata from the story that's been written for that sequence as possible. If someone starts editing it, we know what original source footage is associated with that sequence, which is associated with that text right from the story," Howard says. "So there are all of these inherent associations that happen within our system. When you begin to aggregate them together, that is a tremendous amount of metadata that gets created without you doing anything except for your job."



Crispin recently has enhanced its NewsCat automated cataloging system to help stations transition existing tape archives to digital files on spinning disk.

News automation

If file-based workflows are providing the vehicle to drive greater newsroom efficiency, newsroom automation systems are the automatic transmission of the process. Sure, you can get where you're going without it, but the journey's so much more enjoyable when you have it.

News automation takes many forms, but the consistent thread that ties these automation systems is the reliance of technology to simplify labor-intensive tasks. When it comes to automating control of news production, Ross Video has responded with OverDrive.

"What OverDrive does is bring that traditional control panel from a production switcher and format that onto a graphical user interface that is timeline-based," explains Darren Budrow, Ross Video director of sales.

The production switcher doesn't go away and remains the nerve center communicating with external devices, but OverDrive replaces buttons and fader handles with a simpler interface. In some respects, OverDrive is similar to a master control automation system. It will look at the playout server and inform a technical director with a graphical warning if a clip is unavailable. It also lets operators add, remove or rearrange items in the rundown on the fly.

"The whole focus of this is being able to do this in a live environment, where breaking news is literally happening all around you," Budrow says.

Currently, OverDrive can interface with the Avid iNews or AP's ENPS newsroom computer systems via MOS, so rundowns can be published directly to the controller and operators can view them on the OverDrive timeline.

Elsewhere, automation is assisting newsrooms with archiving stories for convenient retrieval after the newscast airs. For the past few years, Crispin has answered this need with its NewsCat product.

"What we've done is integrate an interface to the newsroom computer systems that have already defined that clip, and we have databased all of the attributes associated with the news clip," explains Alan DeVany, company founder and president. "We've done that in a way to provide a very simple search tool via a Web interface anywhere on the network with just a click of a mouse."

Recently, the company has added an extension to NewsCat to help stations ingest and catalog their shelves full of archived videotape.

"To find something older than what we've had an interface to, all of a sudden we have much less descriptive information about that held in our database," DeVany says. "We have designed a tool to allow stations to pull a tape, dump it into the system and then archive it. We create a low-res proxy of that as we do for all of our news clips, and anywhere on the network we can allow for anybody to continue to add descriptors about that video that they see to a common searchable database."

Fade to black

There was a time when a station wanted to remain competitive with the station down the street. File-based workflows and automation helped them cut costs, increase efficiency and produce a better product so they could do just that.

Today, a station doesn't just compete with its cross-town rival. Technologies like the Internet have seen to that. Broadcast news operations are at the dawn of a new competitive reality in which every media outlet is a potential competitor. Maintaining and improving upon efficiencies realized through adoption of file-based workflows and news automation will be critical to their success in this hotly contested news environment. ◀

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Getting more local with coverage

Give viewers the news they want, when and where they want it, says Scripps senior VP.

Six of the 10 television stations Bill Peterson oversees as senior VP for The E.W. Scripps Company television station group are launching high-definition local news. That, combined with his long history in the broadcast industry that began as a news photographer and reporter, definitely make Peterson qualified to offer insight into where TV news is headed.

Peterson, who has been a news director at five stations and a VP and general manager at four others, including WRAL-TV in Raleigh, NC, will present a keynote speech at the *Broadcast Engineering/Broadcasting & Cable* News Technology Summit in Chicago.

Q: How will Scripps approach local news going forward given the high degree of flux in technologies, delivery platforms and audiences?

Bill Peterson: Clearly, the path to success when it comes to these changes is to be adjusting with them, and we're going to be driven more and more local. That means we're going to be producing more material and probably gathering more material.

Our strategy is to be where the viewer is and to provide content when they want it, where they want it. I think most of the big players in our industry realize the same thing and are headed in the same direction.

Q: From a tactical point of view, can technologies like file-based workflows help your stations deliver more local news where and when viewers want it?

Bill Peterson: There will have to be more people who go out and gather news, so we'll have to find efficiencies in the way we do that.

William Peterson, senior VP for The E.W. Scripps Company, says that citizen journalists play an important role in the future of news.

There's also going to have to be more people out selling advertising.

We will have to adjust our staffs and probably increase them to accommodate those needs, but obviously the first place you turn to is to see if technology can allow you to redeploy human resources.

Q: How are your news organizations responding to new technologies?

Bill Peterson: The people in the field seem to be adjusting faster than those of us in the corner office. There was a big accident on I-95 in Baltimore. WMAR literally got it on its Web site almost instantly because a photographer snapped a couple of shots with his cell phone, sent it to YouTube and from YouTube put it on the Web site.

Q: What role do you see for citizen journalists in the future of news?

Bill Peterson: They fit in. There will have to be some people in the newsroom who vet that material to make sure that it is what it appears to be and that it's legitimate.

Even now, I look out from my desk and watch some of the CNN coverage. If there's a big breaking news story, often some of the first video it will be using is from people in the field who happened to snap off a few digital images and send them in.

Q: Do you think there will be stories that get told better with HD or stories that would not have been told at all without it?

Bill Peterson: I don't know that they will be told better, but I think from a viewing standpoint, there are stories that can be more compelling. One always pops to my mind. I can remember sometime in the spring after WRAL introduced local HD news, there was an average story being done; it would have been two-thirds down the list in the morning meeting. The state government was making an effort to acquire and fix up some historical buildings near the capital. They were originally residences. It was a fairly vanilla story.

Well, the video of these grand old homes in high definition was just amazing. You became so interested in the video of these structures that a story that in standard definition would be interesting was simply jaw-dropping in high definition.

Q: What tips can you offer others as they plan for the future?

Bill Peterson: There still is so much happening that to be drawing a line in the sand in mid-October 2007 and be saying that this is where the future is and this is where we're going, that's trying to be clairvoyant, and that's pretty dangerous. ◀

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Presented by John Luff
December 11, 2007
2:00 pm EST

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Streambox's ACT-L3

WDIV-TV in Detroit delivers live signals from the Great Lakes sailboat race.

BY JEFF LIEBMAN

Two years ago, WDIV-TV — the Post-Newsweek owned, NBC affiliate serving the Detroit TV market — was challenged with providing viewers with live coverage of the Port Huron to Mackinac Island's 82nd annual sailboat race. The race incorporates 250 racing regattas in the Great Lakes, hosting sailors from around the world. The event generally lasts three days, depending on weather conditions. It begins in Port Huron (about an hour north of Detroit), goes up through Lake Huron and ends on Mackinac Island (where Lake Huron meets Lake Michigan).

A local TV station covering a sailboat race might not seem like that much of a challenge; however, this race takes place over a 200-mile course, and depending on weather conditions, can be as much as 10 miles to 15 miles off the coast, between the Michigan and Canadian shorelines. It's not possible to use portable microwaves and standard KU-band uplink technology.

Back in 2006, our first year of coverage, we rented two portable, gyro-stabilized Nera F55 Inmarsat fleet satellite dishes from a London-based company. The boats are very expensive, so we couldn't drill into the deck of the boat we were using. Instead we built a small, lightweight metal suction-cup platform to anchor the dishes on the deck. The problem we still encountered was the listing of the vessel from side to side, as we could only get a signal when the sailboat listed one way. Both satellite dishes were tied together using a Talking Head videophone. The technology offered us 64K bandwidth on each end, for a total of 128K. The picture quality, albeit poor, achieved what we wanted, which was live video from a vessel speeding in the middle of the Great Lakes. On day two of the race, we encountered harsh weather conditions. Most of our equipment became waterlogged, and we lost a camera. Maintaining communication to coordinate live shots was hampered because of our crew's difficulty to remain in one position to get a satellite phone call out to the station.

WDIV-TV photographer Tim Pamplin took edited content and encoded it using the Streambox software. He then transmitted the data using the two Hughes BGANs.

A new plan

Today, the technology enabling remote transmission from a moving boat has improved drastically. This year we used Streambox's ACT-L3 Portable Video Transport Solution with the company's SBT3-6102 encoder and STB3-D5101 decoder. This system was attached to a wireless Sprint air card and two Hughes 9201 BGAN Inmarsat terminals as the means of transmission. The term BGAN stands for Inmarsat's new "Broadband Global Area Network" transmission.

Space is an issue onboard a boat; every inch counts. By combining these two types of technology, we saved a massive amount of space and weight, meaning we could add other devices. BGAN guarantees a video stream of up to 256K. Each terminal looks much like a portable laptop, with similar weight and design.

Our crew took advantage of background IP, available aboard the Inmarsat bird. This allowed us to occassionally reach as much 400K. However, because you're using background IP, and not streaming class, it is susceptible to decreasing at any moment in the middle of a transmission if multiple other users suddenly access the network.

We based a WDIV crew — photographers Tim Pamplin and Cesar Gonzalez and reporter Paula Tutman — onboard the 154ft-gaff-rigged topsail schooner, the Highlander Sea. This restored, 83-year-old sailing

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vision

1 the act or power of sensing with the eyes. **2** the act or power of anticipating that which will or may come to be. **3** a vivid, imaginative conception. **4** an object of extraordinary beauty. **5** *a new direction in live production.*

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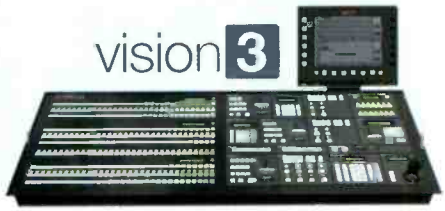

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vessel was large enough to accommodate our crew and equipment. Keep in mind, our crew spent three days onboard the boat, so we needed to pack all the equipment in watertight cases, including plenty of tape and batteries. Prior to the race we worked with vendors to ensure our technical plan would actually work. Hughes could not guarantee our success on a moving vessel, without the particulars of the degree of list of the boat or exact speed at which we'd be moving. Similar transmissions have been attempted by a broadcaster from a boat in the Caribbean with limited success.

Two weeks before the race, Pamplin took the equipment out on a much smaller boat and ran tests for us, putting the system through some paces. The tests were aimed at delivering the best possible live video signal over IP using first wireless EvDO, then BGAN satellite technology. Our second goal was to guarantee the store-and-forward process that the Streambox system offers. In this manner, we could be assured that at the very least we'd be able to get content, whether it be "look lives" or news packages back to the station. We looked at products on the market to transmit video over IP and selected Streambox's system for its ease in use, durability and reliability.

WDIV established a temporary control room aboard the Highlander Sea.

To assist with the race coverage, we had a team follow the racers on land, up the coastline, including WDIV chief photographer Dave Klein and news operations manager Jeff Liebman. Our land crew used a powerboat during the day to capture video and sound with the other racers, feeding that video back to Highlander Sea by portable 13GHz microwave, when available. In this manner, all video would be assembled on the main workboat, edited on an Avid Xpress laptop, and then stored and forwarded via the Streambox back to the television station for broadcast.

In addition, using a series of Sony Mini-DV HVR-A1U cameras mounted on Sticky Pods around the Highlander Sea, we were able to produce a live stream back to the television station's Web site. The Mini-DV cameras were outfitted with Century Optics 37mm fisheye lenses to provide Web viewers with a dynamic view of the race in progress.

To protect the cameras, we used a combination of underwater housings and simple plastic resealable zipper storage bags. The cameras were then

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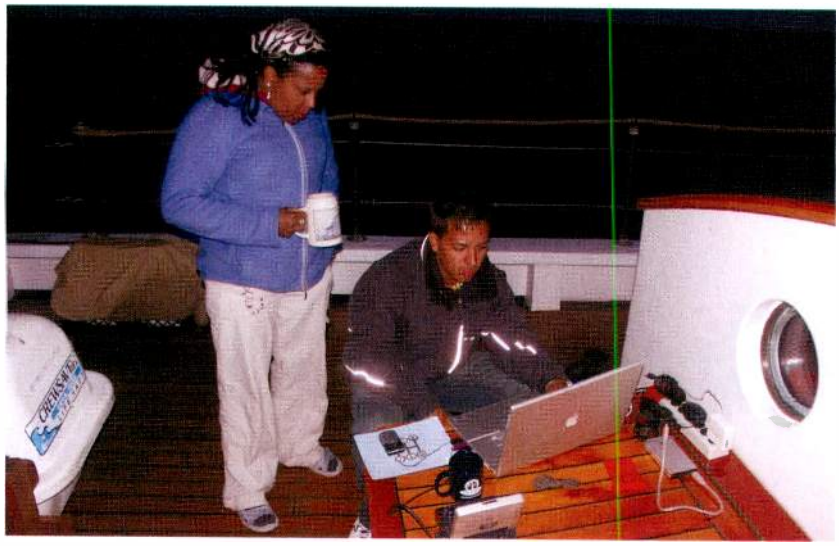
firewired into the Streambox, and when EvDO coverage was available, we delivered the signal back to our Web site. When the sailboats tacked to the northwest, toward the Canadian border and away from the Michigan coastline, we switched to the BGAN terminals for connectivity through Inmarsat in the Netherlands, and eventually on the Internet.



Onboard Highlander Sea, video was assembled and edited on an Avid Xpress laptop. It was then stored and forwarded using the Streambox system.

Reporting back

Tutman provided live reports back to the station all weekend long for all newscasts, along with a video blog and the occasional live commentary for the stream. Web viewers from around the world — coming from North Carolina and as far away London — responded by e-mailing questions.

Pamplin worked as the transmission expert onboard the main workboat, managing the live stream to the Web site and our newscasts. "With EvDO we peaked at about 600K, over a 0.5Mb," he said. Pamplin also said the learning curve on the Streambox was easy, allowing him to worry about everything else happening onboard the boat. He did run into a challenge when it came to keeping the BGAN terminals aimed properly to Inmarsat because the wind changed direction without warning, thus changing the heading. To combat the wind, Gonzalez used gaffers tape to keep the laptop from moving from side to side as the boat moved.

The video quality was impressive, with little pixilation in the signal. Using the store-and-forward method to deliver the news packages, it was nearly impossible for the average TV viewer to notice the difference. Live shots were delivered as video over IP.

For the station team back in the newsroom, getting material from the Streambox to air was simple because the device offers standard broadcast connections out, such as BNC video and XLR audio outputs. It also holds material in the box, awaiting an operator's command at a computer screen to play out the material. From a workflow standpoint, we did have to adjust things such as deadlines and material size.

When using the store-and-forward method, plenty of time (up to 45 minutes) has to be added into the normal mix for sending material. The material must be kept small in size, which will probably please many news producers, as the longer the length in media, the longer it takes to send. Dependent upon what encoding rate we could use, we averaged (using a 2Mb rate) about 20 minutes to 30 minutes from the time the media was encoded to the time the material was registered, decoded back at the station and available for playout in real time. That meant Pamplin, as the transmission guru, had to stay on top of Gonzalez and Tutman to meet their deadlines early while onboard the boat.

The experience for the WDIV team was incredible. Viewers both on TV and online were treated to live and taped images they ordinarily wouldn't experience without sitting on a racing sailboat in the middle of the Great Lakes. The technology and news workflow that we chose was truly nonlinear and was bolstered by the ease with which we could move video over IP. BE

Jeff Liebman is news operations manager for WDIV-TV in Detroit.

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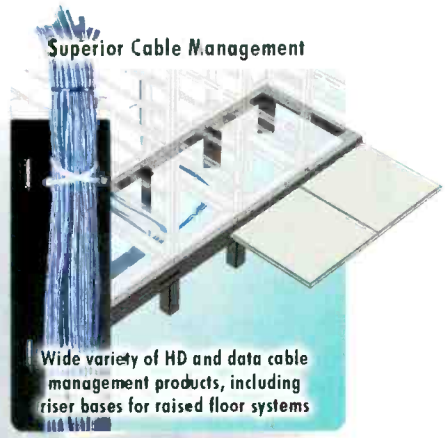

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Digital cinema cameras

A lower cost, new camera tries to beat out the traditional players.

BY JOHN LUFF

On Aug. 31, Red Digital Cinema delivered its first 25 RED production digital cinema cameras. RED and other digital cinema-oriented products like ARRI's ARRIFLEX D-20, DALSA's Origin, Sony's F23 and Thomson's Viper FilmStream cameras represent the high end of a spectrum that goes all the way to webcams shooting high-resolution pictures for amateur astronomy.

Breaking down each camera mentioned above:

- The ARRIFLEX D-20 provides variable frame rates. In the data mode, it offers 2880 x 2160 at 4:3 or 16:9 with 12-bit resolution. In the HD mode, it provides a 1920 x 1080 YUV or RGB 10-bit logarithmic or ITU 709 gamma-corrected output.
- Origin provides a single output format of 2:1 with 4096 x 2048 imaging, with 16 bits.
- The F23 supports 4:4:4 1920 x 1080 RGB imaging and 1080/23.98p, 24p, 25p, 29.97p, 50p, 59.94p, 50i and 59.94i formats. It offers 14 bits.
- Viper FilmStream shoots in variable aspect ratio (16:9 and 2.37:1) at up to 1080p resolution, with 10 bits.

While Sony, Thomson and others build cameras suitable to capture images for cinema output, they also offer standard broadcast interfaces (1080i/p and 720p) that make their utility different. Other factors, including bit depth, define performance as well. In a new twist on technology and marketing, RED offers both 4K and broadcast imaging, with 12 bits.

The common worldwide TV broadcast formats are 525- and 625-line based. Above that, of course, are the common HDTV formats 1080i/p and 720p. Interestingly, NHK has a research project for ultra-high-definition imaging at 8K — 7680 x 4320 pixels with a 1.77:1 aspect ratio (16:9). High-end government and astronomical cameras often have a similar capability of 7216 x 5412 (and probably much higher for the ones we don't even know about). Pixel depth varies, with 8 bits or less for many broadcast products and goes as high as 18 bits for Kodak sensors used as image acquisition devices. Some hints at capability can be garnered by looking at Kodak's line arrays, which have up to 14,404 pixels across. Imagine a scanned 16:9 image based on that with 117 million pixels per color. The data rate could easily extend to 302Gb/s (4:4:4, 72Hz, 12 bit).

Resolution independence

Why does this incredible range of capability need to exist? Simply put: Because it can. Most of today's broadcasters are familiar with downsampled images. Many facilities have been using HD cameras in SD applications with the expectation of needing HD capabilities later. Similarly, upsampling is no big deal today. When economics or technology dictate, SD 16:9 cameras are used as input sources for HD workflow.

I remember when Quantel first started touting "resolution independence." Us TV folk didn't get it for the most part, because we couldn't figure out why you would want to do that. Now applications abound. Today, digital cinema cameras shoot

Red Digital Cinema's RED camera delivers 12 megapixels at up to 60fps, and records wide dynamic range and color space 12-bit native RAW. 12,065,000 pixels deliver ultra-high-definition resolution.

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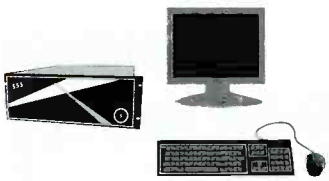

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a commercial from which high-quality stills are grabbed for print use. HD shots with HDV are used for SD final delivery so an HD copy can cost-effectively be kept on the shelf.

Just a few years ago, SD cameras enjoyed the lion's share of the market, but today SD cameras are a rapidly diminishing share of the total market. One major manufacturer has openly said it will cease manufacturing SD-only cameras by the end of the decade. Even replays for the NFL have converted to HD this year in part because rights holders have to deliver an HD copy of every game before a certain date.

Such firm business strategies are changing what we consider broadcast quality. Two years ago, two of the CEA giants began delivering HD consumer cameras (HDV). Prices are still high, but think about the value. Professional HD video, notably newsgathering, is being shot with cameras that cost less than an ENG lens cost a few years ago. This would not be so amazing if it weren't for the fact that the quality is amazingly good. It's not the best HD one can acquire — and certainly not the output from a DC camera — but it sustains pretty well in many applications.

This intrusion of consumer product development into the professional realm is an important and pervasive change in our industry. We might not like it much, but we are a small and unattractive industry to many companies.

To add to the confusion, there are multiple types of image sensors. IT, FIT and FT CCDs have been joined by CMOS sensors in the last few years. While CMOS offers higher sensitivity and lower power consumption, which are particularly important for the still camera industry, the differences between CCD and CMOS include tradeoffs that make neither the clear winner for motion imaging.

Critical parameters, including lower noise and higher dynamic range, make CCD attractive. CMOS offers a direct digital output, while CCD requires analog-to-digital conversion. Both appear in professional products and likely will for some time to come. As CMOS improves, in part due to significant research for consumer applications, it's likely to be used more in professional situations as well.

Consumers set the standard

This intrusion of consumer product

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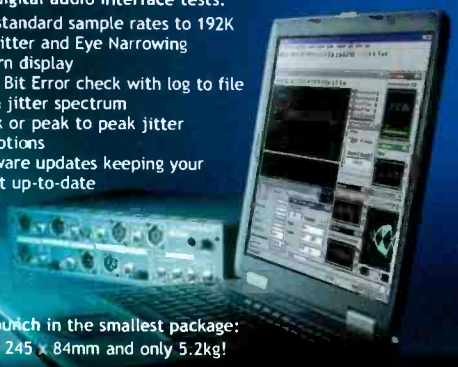

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development into the professional realm is an important and pervasive change in our industry. We might not like it much, but we are a small and unattractive industry to many companies. Small niche manufacturers will always be able to justify investing in part because they can be agile as the industry changes, and they can manufacture products without huge R&D and overhead costs. Large manufacturers face considerable uncertainty in our small marketplace in which they can choose segments to service.

Nowhere is this a bigger factor than in cameras. The engineering talent and manufacturing expertise needed to develop and then successfully market television cameras is both scarce and expensive. Time to market is long, and the size of the market is tiny compared with consumer applications. This is why HDV professional cameras are essentially upscale, high-end consumer products. Without consumers, the professional industry would not likely experience such important advances. Big ticket items, such as asset management systems that cost hundreds of thousands of dollars to install, will always be a fertile business for manufacturers. But $1500 dollar cameras, with only tens of thousands of units sold per year, cannot make a viable market. When a large company builds a big, expensive television camera, expect the price to remain high so they can recover the R&D costs and make a profit. Don't expect many small companies to get into this type of business.

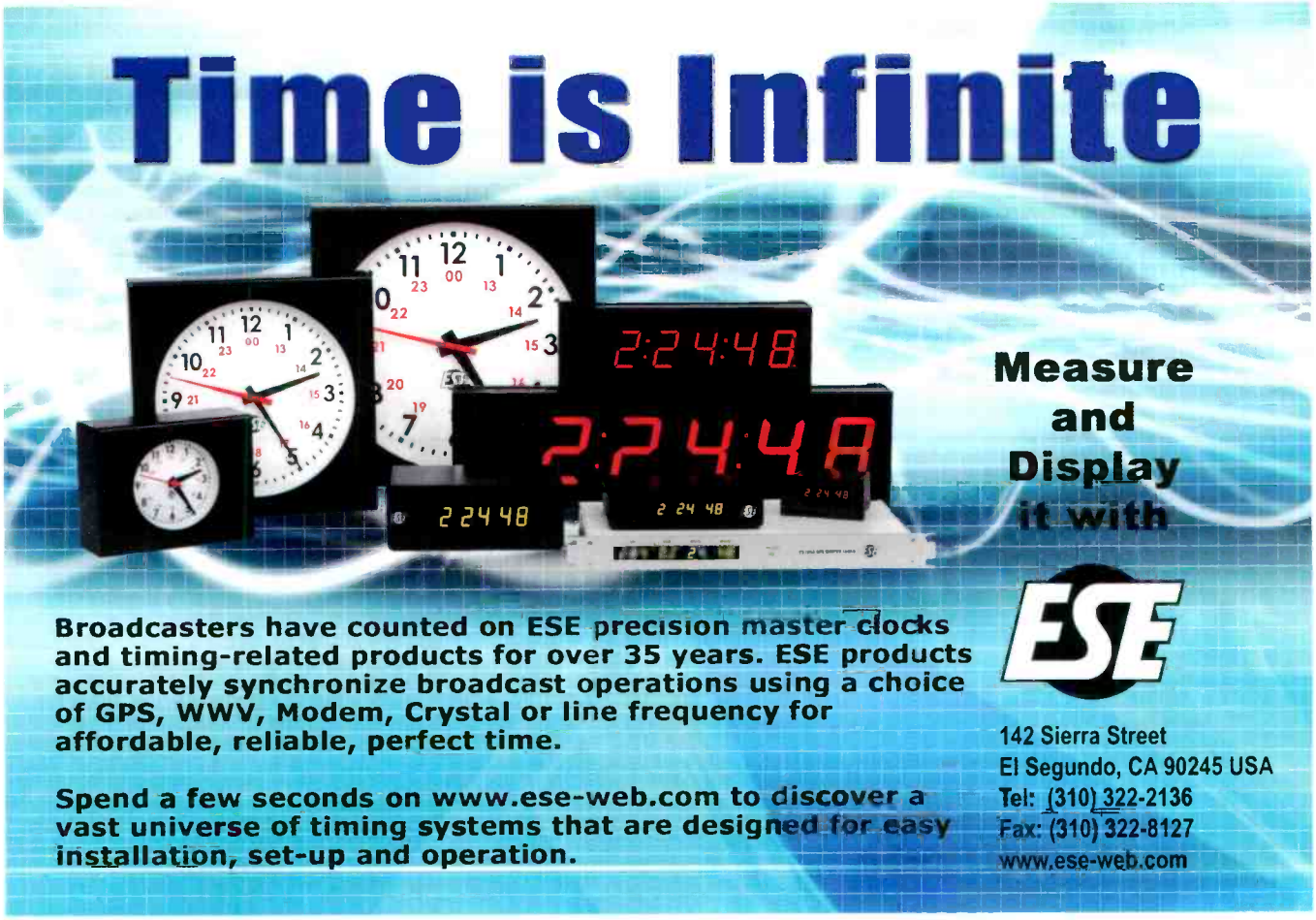
Is RED the answer?

This brings me back to RED. It's a 4K digital cinema-capable camera that costs less than $20,000. It should be no surprise that the development money came from a wealthy and committed patron, who happens to be the founder of Oakley sunglasses. The camera was a hit at NAB again this year and probably shocked some more traditional players with its quality images.

Is it television? Beauty is in the eye of the beholder, or maybe it is in how the resolution-independent technology is applied. Can an upstart with a low price, but no installed base, invade a high-end, film-oriented community that embraces products from traditional vendors? And, can it capture other traditional broadcast and production applications because of the price point? Is RED better than other options? The answer may depend more on the application and less on the price. BE

John Luff is a broadcast technology consultant.

Send questions and comments to: john.luff@penton.com



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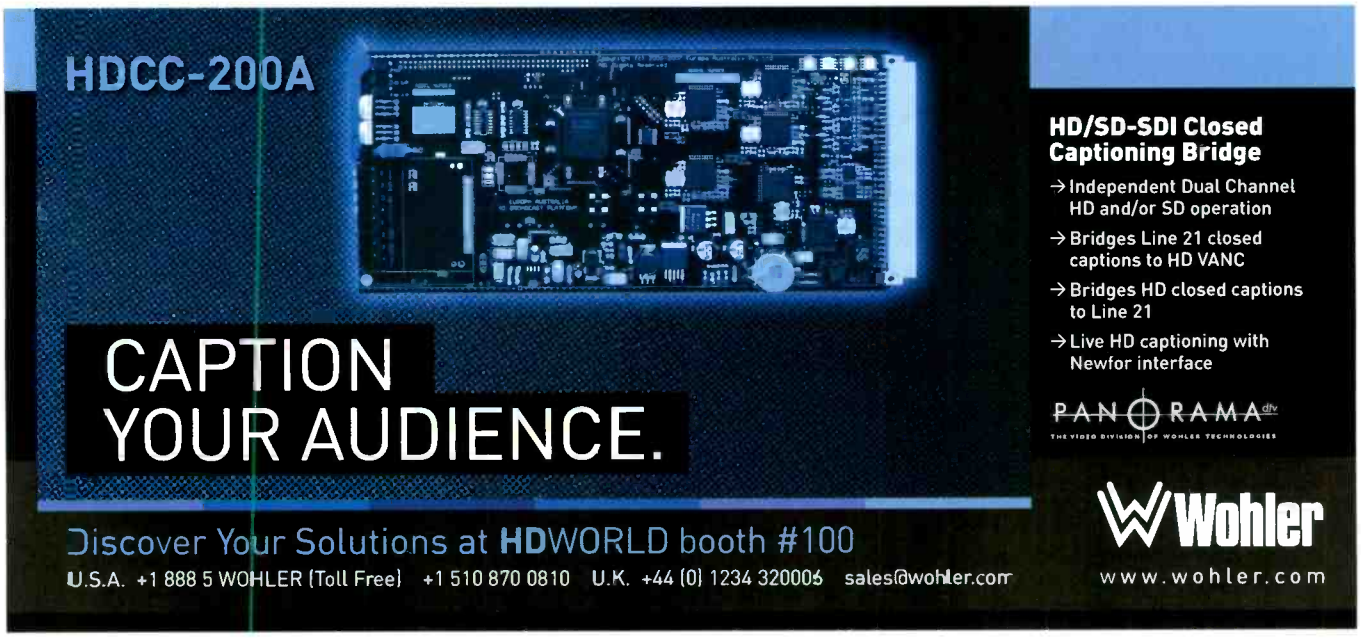
216-241-3343; www.omniaaudio.com



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973-683-0800; www.miranda.com

VPS-715 GINGA — FOR-A

Digital switcher includes frame synchronizer for every input, up to 16 SD inputs and outputs, six keyers and six channels of 3-D DVE; allows 120 seconds of uncompressed video recording and provides two channels (key/fill) with simultaneous playback for video insert, CG wipe or slow-motion playback; users can add 2-D DVE in every input, delivering up to 32 DVE channels.

714-894-3311; www.for-a.com

TreStar P — Staco Energy Products

Online double conversion, three-phase uninterruptible power supplies for critical loads feature a digital control system and enable up to eight TreStar P modules to be installed in parallel; process signals 10 times faster than analog methods; include a front control panel with LCD screen, input circuit breaker and internal maintenance bypass.

866-261-1191; www.staco-news.com

T6 Alu — Panther

Tripod system for the DV/HDV market includes a ground spreader, padded bag and fluid head that comes with a two-step drag control, vertical and horizontal breaks, and a sliding balance system with quick-locking plate to center the camera.

818-841-3110; www.panther.tv

PACLR1/PACCC1 — Chief

PACLR1 left/right speaker adapter and PACCC1 center-channel speaker adapter offer a low-profile, lightweight design for easy installation; feature advanced adjustability to position speakers flush with the screen; ship preassembled and include cable management clips; fit flat-panel screens up to 50in; PACCC1 provides up to 5in of height adjustment; PACLR1 reaches a fully extended width of almost 54in.

800-582-6480; www.chiefmfg.com

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FlashNet v6.2 — SGL

New version of the data archive and management software adds enhancements such as error monitoring for both storage devices and media, as well as additional functionality within StorageManager to allow manual movement of material between different layers of storage hierarchy with enhanced grouping functionality; allows Avid Interplay users to manage their archive storage transparently for any number of users.

303-665-0909; www.sgluk.com

FlipFactory v6.0 — Telestream

New release for transcoding workflow automation product line includes simultaneous transcoding while ingesting from tape with the company's Pipeline network encoder, support for HD commercial and syndication workflows, a screen subtitle option, auto-publishing of metadata with media to more video sharing Web sites, integrated two-pass Flash 8 encoding, and support for even more formats.

877-257-6245; www.telestream.net

Express Live — Kulabyte

Platform provides live streaming for Adobe Flash 8/9, VC-1 and H.264 files; incorporates the company's TimeSlice technology, which accelerates the encoding process by multiple factors, increases picture quality and reduces the required bandwidth for video file transmission; encodes and transmits live two-pass VBR video at full SD and HD quality at consumer-level broadband speeds.

512-795-4228; www.kulabyte.com

NewsHub — Nucomm

System for implementing a wide-area urban cellular diversity receive network features four ASI inputs with loop-through packet switching that provide switching of up to four cellular receive sites, and a switchable HD/SD full-format MPEG-2 decoder and NTSC/PAL capability; offers a low signal acquisition time and genlock on all analog format inputs; provides two SDI/ASI outputs, USB/Ethernet and RS-232 remote control.

908-852-3700; www.nucomm.com

XX-HE series — Neutrik

Three-pole connectors include velour chromium housing and machined gold contacts; feature improved chuck-type strain relief for higher pull-out force and faster, easier assembly and boots with a polyurethane gland, which provides more protection from cable bending stresses; male connector (NC3MXX-HE) is designed with improved locking recess without window for more stringent housing and increased durability; female connector (NC3FXX-HE) has improved solid metal latch, which is larger and easier to handle.

732-901-9488; www.neutrik.com

DV Balancer — Chrosziel

Shoulder brace for cameras up to 9lb; features a design for cameras that have the eyepiece of the viewfinder on the back of the housing; the shoulder pad and breast rest absorb the weight of the camera by keeping the hands free for controlling the camera; memory clip ensures that the previous setting can immediately be used again.

+49 89 90 10 910; www.chrosziel.de

Media 100 v12.0 — Media 100

The new editing system adds support for progressive frame formats including real-time SD crossconversion from 4:3 to 16:9, a new time code burn-in feature and deeper integration with the Boris FX product line; enables users to edit in almost any format with greater control over effect compositions including professional color correction techniques with support for 16-bit color.

800-922-3220; www.media100.com

LightSnake USB MIDI — SoundTech Professional Audio

Intelligent MIDI-to-PC cable connects with any standard MIDI instrument or controller and plugs directly into the PC USB port; provides both MIDI in/out, allowing the computer to communicate with and control a wide range of gear; features glowing cable ends when properly connected, 10ft heavy-duty shielded cable, Sony Media Software Demo DVD and USB plug-and-play connectivity.

847-949-0444; www.soundtech.com

C300 — Solid State Logic

Compact, assignable console for sweetening and mix creation features trilevel sync support, serial control of HD VTRs, enhanced 96kHz feature set with provision for up to 16 discrete audio channels, pec/direct switch option, three- or four-channel side/rear surround panning, DAW control with softkey commands, optional four-port MADI daughter card, more than 500 mix inputs and 80 mix busses and integrated 128-input, multiformat surround monitoring; fully scalable from eight to 96 faders, or up to 512 channels.

212-315-1111; www.solid-state-logic.com

DiamondBack 4x4 — Telecast Fiber Systems

Video multiplexer handles four bidirectional NTSC/PAL channels and dedicated 10/100 Ethernet connectivity; supports the company's Adder line of audio, intercom and data multiplexers; features an optional integrated optical switch that provides for full optical redundancy, dual DC power inputs, a front-panel display, a front-panel BNC and a private service channel that provides for point-to-point headset communications.

508-754-4858; www.telecast-fiber.com

EndGame — Pixelmetrix

Quality management solution for IPTV; provides IPTV content aggregators and IPTV operators with a suite of tools spanning the entire content delivery chain, allowing operators to track QoS problems from a single customer through the network to the headend; a graphical consolidation of information from multiple nodes with the network enables IPTV operators to find, isolate and troubleshoot quality-related issues the fastest way possible.

954-472-5445; www.pixelmetrix.com

EM 3732 — Sennheiser

Twin wireless receiver with 90MHz switching bandwidth features high-quality audio performance, numerous connection options, scanning function and transmitter synchronization via infrared interface; has six user-selectable fixed frequency banks and one user bank with up to 60 channels that can be programmed in increments of 5kHz; automatically searches for free frequencies within frequency banks.

860-434-9190; www.sennheiser.com

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CTIA WIRELESS I.T. & Entertainment 2007

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Welcome to CTIA WIRELESS I.T. & Entertainment 2007 in San Francisco, CA. With over 300 exhibitors and special technology pavilions in Mobile Entertainment, Enterprise Mobility, M2M and Application Developers, CTIA WIRELESS I.T. & Entertainment 2007 is the most comprehensive expo in wireless data showcasing ground-breaking innovations and creative solutions for enterprise and entertainment.

This is the one show that brings key audiences such as enterprise users, solution providers, content owners and mobile distribution channels together to form strategic partnerships, service industry needs and create new innovations in wireless data.

CTIA WIRELESS I.T. & Entertainment is truly one show with two personalities.

SCHEDULE AT-A-GLANCE

KEY– Registration Packages Required for Admission

- CTIA Smart Pass
- CTIA Conference Pass
- CTIA Daily Pass
- CTIA Exhibits Pass
- Purchased Special Interest Seminar

Pre-Conference | *Monday, October 22*

Registration	7:30 AM – 5:00 PM	Moscone	
Mobile Entertainment Live!	8:00 AM – 6:00 PM	Moscone Esplanade Ballroom	
4GMF 2007	9:00 AM – 5:00 PM	Moscone/Marriott	
Andrew Seybold University	9:00 AM – 5:00 PM	Moscone Room 122	
Marketing—The Mobile Channel	9:00 AM – 5:30 PM	Marriott Golden Gate A	
NAVTEQ Connections 2007	9:00 AM – 5:30 PM	Marriott Salon 9	
Smart Phone Summit 2007	9:00 AM – 6:00 PM	Marriott Golden Gate C	
Enterprise Mobility	12:00 PM – 6:00 PM	Moscone Room 250	

Day One | *Tuesday, October 23*

Registration	8:00 AM – 5:00 PM	Moscone	
4GMF 2007	9:00 AM – 5:00 PM	Moscone/Marriott	
Keynote Session	9:30 AM – 10:30 AM	Moscone Gateway Ballroom	
Exhibit Floor Open	10:00 AM – 5:00 PM	Moscone	
CTIA Smart Pass Executive Conference	11:00 AM – 12:30 PM	Room 250	
Educational Sessions	1:00 PM – 5:30 PM	Moscone Rooms 200, 220, 250 & 270	
Policy Outlook Track	2:00 PM – 3:00 PM	Moscone Room 114	
Deloitte's Wireless Fast 50 Awards Ceremony	2:30 PM	Moscone Gateway Ballroom	
WIC General Member Reception	6:00 PM – 8:00 PM	AT&T Park	***By Invitation Only***

Day Two | *Wednesday, October 24*

Registration	8:00 AM – 5:00 PM	Moscone	
4GMF 2007	9:00 AM – 5:00 PM	Moscone/Marriott	
Keynote Session	9:30 AM – 10:30 AM	Moscone Gateway Ballroom	
Exhibit Floor Open	10:00 AM – 5:00 PM	Moscone	
Educational Sessions	1:00 PM – 5:30 PM	Moscone Rooms 200, 220, 250 & 270	
Policy Outlook Track	1:30 PM – 5:30 PM	Moscone Room 114	
Mobile Entertainment Reception	5:30 PM – 7:30 PM	St. Regis Hotel	***Ticket Required***

Day Three | *Thursday, October 25*

Registration	8:30 AM – 3:00 PM	Moscone	
Keynote Session	9:30 AM – 10:30 AM	Moscone Gateway Ballroom	
Exhibit Floor Open	10:30 AM – 3:00 PM	Moscone	

CTIA events are in bold. Schedule subject to change.

NAVIGATIONAL GUIDE

CTIA WIRELESS I.T. & Entertainment 2007 is pleased to offer a provocative program of visionary and in-depth sessions, conferences and seminars on the most important issues facing IT professionals, software developers, media companies, wireless companies and technology enablers as they work to implement and build wireless data solutions and mobile entertainment products and services.

Use the guide below to help you determine which sessions and seminars best meet your needs.

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CTIA Educational Sessions ..... page 8–15
- Mobile Enterprise
- Mobile Data 2.0

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Enterprise Mobility ..... page 29
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Deloitte Wireless Fast 50 Awards Ceremony ..... page 29
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- Deloitte Wireless Fast 50 Pavilion
- Enterprise Mobility Pavilion
- M2M Pavilion

For Entertainment Industry Professionals

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- Mobile Entertainment

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- M-tertainment Pavilion

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For International Perspectives

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- UK Pavilion

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For Engineering Professionals & Technologists

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- Deloitte Wireless Fast 50 Pavilion
- Developers Pavilion
- Enterprise Mobility Pavilion
- M2M Pavilion
- Ontario-Canada Pavilion
- UK Pavilion by East of England International

For Application Developers

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For Wireless Carriers

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- Mobile Entertainment
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- Policy Outlook

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NAVTEQ Connections 2007 ..... page 32
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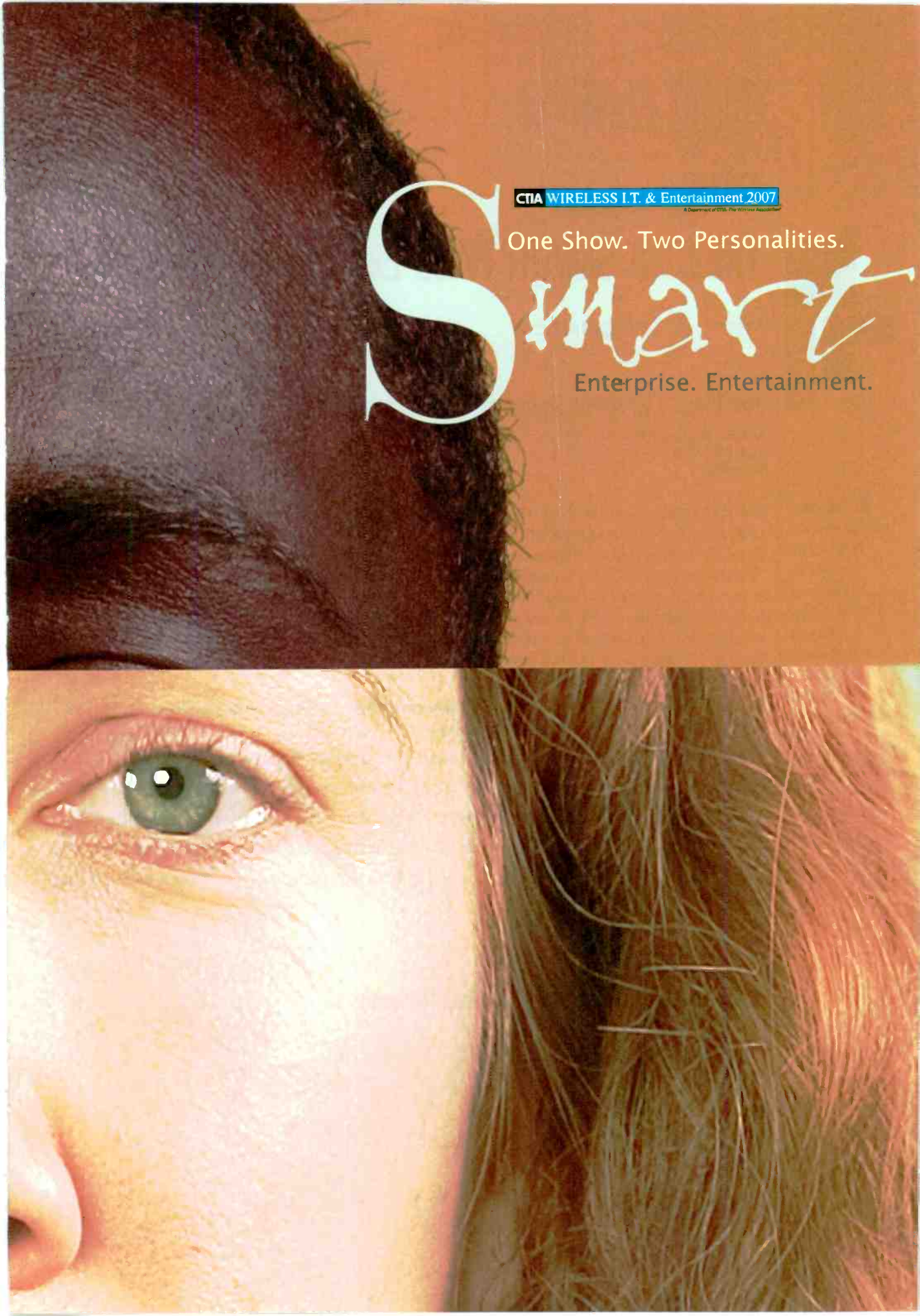
- Deloitte Wireless Fast 50 Pavilion
- Developers Pavilion

* Ticket Required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SMART PASS EXECUTIVE CONFERENCE

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The CTIA SMART PASS Executive Conference

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The iPhone's Impact on Consumers & the Wireless Market

Tuesday, October 23, 2007
11:00 PM – 12:30 PM
Room 250

PLEASE NOTE: *Includes admission to Smart Pass Executive Conference, all CTIA Educational Sessions, Complimentary Seminars, Exhibit Floor and CTIA Keynote Sessions. Please see registration form for details.*

2007 has become the year of the iPhone, a device that has potentially changed the way consumers think about their wireless experience. Following the splash of the iPhone launch, the industry can now examine the impact of the iPhone on consumer behavior and the competitive landscape as a whole. With compelling new data, Compete will share insights around how the iPhone measures up with other advanced devices and the opportunities it provides for the market. With a unique perspective derived from a combination of behaviorally targeted surveys and observed online shopping behavior, Compete will provide insights around who really wants the iPhone, what competitors it is hurting the most, and the true competitive set for the iPhone.

This data will provide a backdrop for a lively discussion with a panel of industry leaders from carriers, handset OEMs and content providers to discuss –

- *The impact of the iPhone and other entertainment oriented devices, for example iPods*
- *Shopping behavior of the iPhone compared to other top devices leading into the holiday shopping period*
- *Specific cross shopping patterns to identify the true competitive set of devices and carriers for the iPhone*
- *Perspectives on the iPhone and other advanced devices as entertainment devices versus a productivity tools*
- *Opportunities for competitors to ride the wave of iPhone success, and open new doors to cater to today's wireless consumer*

STAY TUNED FOR ANNOUNCEMENT OF DAY 2 SESSION!

Latest details available at www.ctia.org/wirelessIT.

CTIA KEYNOTES

Attendees will hear from visionary global leaders in the enterprise and entertainment arenas as CTIA continues to bring the best of both worlds together on one stage in the Moscone Gateway Ballroom.

KEYNOTE HOST:

Steve Largent, President/CEO, CTIA–The Wireless Association®

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DAY ONE

ENTERPRISE

Steve Ballmer, Chief Executive Officer, Microsoft Corporation

Ballmer joined Microsoft Corporation, the world's leading manufacturer of software for personal and business computing, in 1980 and was the first business manager hired by Bill Gates. Since then, Ballmer's leadership and passion have become hallmarks of his tenure at the company.

Variously described as ebullient, focused, funny, passionate, sincere, hard-charging and dynamic, Ballmer has infused Microsoft with his own brand of energetic leadership, vision and spirit over the years.

DAY TWO

Community

Dustin Moskovitz, Co-founder and Vice President of Engineering, Facebook

Facebook has grown to become a social utility that enables more than 25 million people of all ages to share information and communicate with their friends, whether at a computer or on a mobile device. As online and mobile communications converge, Facebook's open platform promotes more efficient interaction among communities of people, no matter where, when, or how they connect. Dustin Moskovitz, Co-founder and Vice President of Engineering at Facebook, will discuss how an open platform empowers developers to quickly build and target new content and applications to any device, giving companies the potential for massive distribution and users more choice than ever before.

Stay Tuned for Speaker Announcements at www.ctia.org/wirelessIT

CTIA EDUCATIONAL SESSIONS

CTIA's Educational Sessions are the most comprehensive in the Wireless Industry. These in-depth sessions will address the most important issues facing IT professionals, software developers, media companies, wireless companies and technology enablers as they work to implement and build wireless data solutions and mobile entertainment products and services.

Mobile Enterprise Track

Media Sponsor THE WALL STREET JOURNAL

Mobile Entertainment Track

Sponsored by OLIVER WYMAN

Mobile Data 2.0 Track

Sponsored by KPMG

Policy Outlook

Sponsored by CTIA The Wireless Association®

CTIA EDUCATIONAL SESSIONS

Tuesday, October 23 & Wednesday, October 24
1:00 PM – 2:30 PM & 3:30 PM – 5:30 PM
Moscone Rooms 200, 220, 250 & 270

Mobile Enterprise Track

Media Sponsor THE WALL STREET JOURNAL

To be competitive today, companies in nearly every industry need to adopt a wireless strategy. Wireless—voice and data—has been shown to improve speed of communication cycles, enhance efficiencies, and drop better results to the bottom line. The Mobile Enterprise Track will feature an in-depth look at real-life wireless solutions across multiple industry categories that can be deployed today. Discussions will focus on the solutions that are available in the marketplace today—hardware and software—look at issues such as integration and security, and will include information about returns on investment made in wireless data systems. The sessions in this track will be geared to bring educational value for those asking wireless "beginner" questions, as well as to those in expansion mode developing "second stage" wireless strategies.

Topics:

Enterprise Applications

What Can the IT Managers Implement Today to Mobilize the Enterprise Workforce?

Tuesday, October 23, 2007
1:00 PM – 2:15 PM
Room 220

Each carrier is responding to demands in the Enterprise marketplace and partnering with major application providers. This panel gathers together wireless network providers and application providers to discuss the most important issues for successful IT implementation and adoption. These panelists are the experts on what is available today, and what will be available in the coming 6–24 months.

Moderator:
Chris Isaac, *Partner,* PriceWaterhouseCoopers

Speakers:
Edward Schmit, *Dev. Central Program,* AT&T Mobility

John Traynor, *Sr. Dir., Enterprise Embedded Devices,* Microsoft

David Werezak, *VP Enterprise ,* Research In Motion

Sprint, TBD

Verizon Wireless, TBD

Customer Relationship Management in a Mobile World

Tuesday, October 23, 2007
2:30 PM – 3:45 PM
Room 220

Wireless Customer Relationship Management (CRM) applications are the fastest growing enterprise application segment. CRM is now a billion dollar revenue market in North America with strong growth and high ROIs. This panel features end user case studies which showcase implementations by companies such as Canada's leading commercial real estate firm and the world leader in global storage systems.

Moderator:
Brenda Lewis, *Principal,*
Transactions Marketing, Inc.

Speakers:
Wahid Fazli, *Manager, VMI Strategy,*
Hitachi Global Storage Technologies, Inc.

Mario Kovacevic, *VP, Info Tech & Marketing,*
J.J. Barnicke Limited

Microsoft Customer Case Study, TBD

Wireless Productivity Tools

Selecting the Right Device

Tuesday, October 23, 2007
4:00 PM – 5:15 PM
Room 220

In the 21st century, empowering a workforce with wireless productivity tools is an essential task of business. Selecting the correct device is key to maximizing employee productivity, efficiency, and mobility. Determining the mobile policy of the entire organization will also help balance security and convenience for all. Through the development of worker profiles, companies can now determine their mobility needs and control costs by choosing the best device in terms of cost, benefit, ROI, and product options. This panel will explore a variety of issue areas in enterprise device selection and management, while also seeking to find the overall formula for enabling the mobile workforce.

Moderator:
Avi Greengart, *Principal Analyst, Wireless Devices,*
Current Analysis

Speakers:
Hammish Caldwell, *Executive Director of Product Management and Marketing,* AT&T Mobility

David Ginsburg,
VP Marketing and Product Management,
InnoPath Software

Pankaj Gupta, *CEO,* Amtel

Andy Willett, *SVP, Business Development,*
NetMotion Wireless

Speakers have been invited.
Program and Speakers are subject to change.

CTIA EDUCATIONAL SESSIONS

Email Solutions

Issues to Adoption

Wednesday, October 24, 2007
1:00 PM – 2:15 PM
Room 220

Every Enterprise makes a decision to begin with wireless services sometime; most opt to begin with wireless email. What is the status of wireless email adoption in the enterprise versus use of online email? What issues with wireless are holding back the late adopters? What questions do IT managers need answered before they invest in wireless email solutions? This panel addresses those questions.

Moderator:
Steve Follin, *Director, Technology Integration*
Deloitte Consulting LLP

Speakers:
Ross Bott, *CEO,* SEVEN Networks

Sean Byrnes, *CEO,* Flurry, Inc.

Mark Connon, *CEO,* Digit Wireless

Scott Cooper, *SVP, Mobility,* Nokia

Joe Fabris, *Director, Wireless Solutions,* Palm, Inc.

Enterprise Converged Services

Options for Optimization

Wednesday, October 24, 2007
2:30 PM – 3:45 PM
Room 220

Wireless is able to take over data delivery from Wireline—Statement of Fact or Statement of Hope? Are the best features of both Wireless and Wireline being utilized in Enterprises today, and if not, what options are out there for an IT manager to make the decisions to optimize both telecom networks to the company's best advantage? This panel joins ecosystem providers (pieces of the puzzle) to help the IT manager sort out the bigger picture.

Moderator:
Adam Kennedy, *Director,* PricewaterhouseCoopers

Speakers:
Jim Grams, *CTO,* Azaire Networks

Gary May, *Director Bus Dev, Enterprise,* Ericsson

Manish Raj, *Sr. Director, Product, Enterprise,* Motorola, Inc.

Larry Tichavsky, *Solution Engineer,* Sprint

Alastair Westgarth, *COO,* Tango Networks

Machine to Machine Communication

Smart and Efficient

Wednesday, October 24, 2007
4:00 PM – 5:15 PM
Room 220

Wireless M2M (Machine-to-Machine) is an emerging market with much potential for Enterprise efficiencies. Some of the critical elements of adoption include reliability and systems strongly integrated with other IT network applications and systems. This M2M intelligence-based utilization of technology has shown strong ROI, and this panel will discuss actual deployments and case studies of integration issues.

Moderator:
Derek Kerton, *Principal Analyst,* The Kerton Group

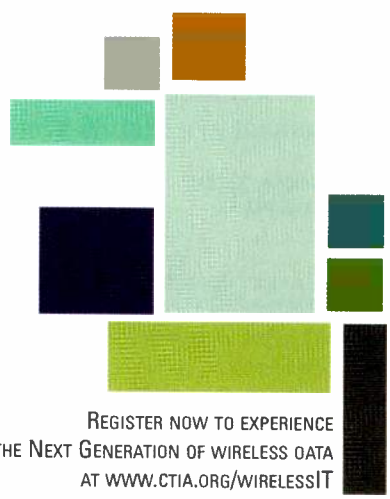
Speakers:
Andrew Berman, *SVP & GM, Mobile & M2M*
Sierra Wireless

Daniel Collins, *CTO,* Jasper Wireless

Dean Fledderjohn, *GM, M2M Business Segment*
Kyocera Wireless

Anders Franzen, *COO,* Wavecom

Chris Purpura, *SVP, Marketing,* Aeris Communications



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Mobile Entertainment Track

Sponsored by OLIVER WYMAN

Mobile Entertainment used to revolve almost exclusively around "personalization." Today, however, Mobile Entertainment is on the cusp of delivering rich multi-media content to a mass audience. But meeting mass market expectations is a tall order, and wireless carriers and their partners will have to collaborate closely if they are to succeed. The Mobile Entertainment Track will delve deeply into the impediments to adoption of Mobile Entertainment products and services, with special emphasis given to music, video, games and mobile social networks as those mobile products evolve from forms of "idle" amusement into powerful interactivity elements all their own.

Speakers have been invited.
Program and Speakers are subject to change.

Topics:

State of Mobile Content Mini-Conference

Tuesday, October 23, 2007
1:00 PM – 3:30 PM
Room 250

After years of mostly hype, mobile content has taken off in the last 24 months; helping carriers to achieve 15% of revenues from non-voice services. Ringtones have led the way, and they now account for as much as 10% of the music industry's revenues. But already sales from mobile content are beginning to slow. This mini-conference will feature the insights and predictions of the industry leaders who have P&L responsibility for Mobile Content within their companies on the steps they feel that they, their partners, and the industry as a whole must take in order to combat the leveling off of mobile content sales and keep the mobile content rocket climbing.

Carrier Panel

1:00 PM – 2:15 PM

Moderator:
Douglas Garland, *Executive in Residence*
Kleiner Perkins Caufield & Byers

Speakers:
John Burris, *VP, Wireless Data Services,* Sprint

Mark Collins, *VP, Consumer Data Services,* AT&T Mobility

J. Lee Daniels, *Staff VP, Consumer Prod. Development*
Verizon Wireless

Wade McGill, *SVP, Product Management and Development,* ALLTEL

Warren McNeel, *VP, Product Development,* T-Mobile

Content Provider Panel

2:15 PM – 3:30 PM

Moderator:
Bryan Biniak, *Managing Director*
Provenance Ventures

Speakers:
Greg Clayman, *SVP, Mobile Media,* MTV Networks

Bernard Gershon, *SVP & General Manager*
ABC News Digital Media

Lucy Hood, *CEO,* Jamba

Cyriac Roeding, *EVP,* CBS Mobile

Howie Singer, *VP, Strategic Technology*
Warner Music Group

Mobile Games

Enhancing the User Experience

Tuesday, October 23, 2007
1:00 PM – 2:15 PM
Room 270

Mobile game publishers often site handset design issues as the main reason behind the less than exciting gaming experience on most mobile devices today. But presenting a compelling user experience via a small device designed for phone calls is no easy task and many in the handset industry argue that, to boost the market, ecosystem players must better coordinate their efforts. How can industry players work together to offer mobile games that are as exciting as console games? What are some of the issues that are keeping the mobile games market from reaching its potential? This session will uncover the specifics of the collective industry effort needed to jumpstart the mobile gaming market.

Moderator:
Sascha Segan, *Lead Analyst,* PC Magazine

Speakers:
Travis Boatman, *VP, Worldwide Studios, EA Mobile*
Electronic Arts

Gonzague da Vallois, *VP, Publishing,* Gameloft

Stephen McDonnell
Market Development Manager, Games, Ecosystems & Market Dev., Mobile Devices Business, Motorola, Inc

Paul Whitaker, *Head of Games, North America,* Nokia

Mike Yuen, *Senior Director, QUALCOMM's Gaming Group*
QUALCOMM

Mobile Music

The Evolution Continues

Tuesday, October 23, 2007
2:30 PM – 3:45 PM
Room 270

While ringtones have provided the music industry with a much needed lift in recent years, ringtone sales are leveling off and new ringtone customers are not coming into the market as quickly as they once were. Both carriers and record labels are looking at new physical and digital products to re-ignite consumer interest. This session will feature a frank discussion on the state of the mobile music business and offer insights into new ways to utilize the mobile channel as a means of music industry growth with emphasis on the evolving subscription and pricing models that will take us there.

Moderator:
Ralph Simon, *Chairman Emeritus & Founder* MEF & Live Earth

Speakers:
Thomas Hesse, *President, Global Dig. Bus. & U.S Sales,* SONY BMG Music Entertainment

Jorgen Larsen, *Chairman of the Board* iLoop Mobile Inc.

Glenn Lurie, *President, National Distribution,* AT&T Mobility

Bret Moore, *GM, Mobile Services* RealNetworks, Inc.

Michael Nash, *SVP, Digital Strategy & Business Dev.* Warner Music Group

Lifestyle on the Run

Taking Social Networking Mobile

Tuesday, October 23, 2007
4:00 PM – 5:30 PM
Room 250

Among the hottest properties on the Internet are Social Networking sites. In order to better serve the interests of their customers and to fully integrate their services with their customers' lifestyles, many of these sites are working to develop successful mobile extensions. Now brands and marketers are raising the stakes by seeking business opportunities that drive value from on-line communities & increased advertising opportunities. Here, too, it would seem that mobile can help. However, numerous impediments remain, including determining which services to extend and how to best utilize mobile devices to extend them. This panel will seek to bridge the gap between Web-based communities and mobile users by providing insight into how mobile can help social networking communities increase the value they provide to their members.

Moderator:
Mark Donovan, *CMO and Senior Analyst,* M:Metrics

Speakers:
Shawn Conahan, *Founder and CEO. ,* Intercasting Corp.

John Dearborn, *CEO,* 3 Guppies

Frederick Ghahramani, *Co-Founder and Director,* AirG

Michael Grossi, *SVP, Strategy and Business Development,* Helio

Paddy Holahan, *CEO,* NewBay Software

Dominick Tolli, *VP, Mobile Data Services,* Virgin Mobile USA

Razing the Garden Wall

Making the Leap to Off Portal

Tuesday, October 23, 2007
4:00 PM – 5:15 PM
Room 270

The reality is that carriers are slowly moving away from direct deck sales models and embracing off deck opportunities. A number of factors are slowing the carrier migration to off portal services, however, including the fear of cannibalization. Challenges faced by content providers include revenue leakage, lack of standards and common practices, and very little seamless technical integration. This group of industry veterans will examine these and other issues.

Moderator:
Thomas Ryan, *Entrepreneur-in-Residence* Bessemer Venture Partners

Speakers:
Andrew Bud, *Founder & Executive Chairman,* mBlox

Jayanthi Rangarajan, *President & CEO,* Novarra

Fredrik Ruben, *Head of Sales, Ericsson IPX, North America,* Ericsson IPX

Steve Shivers, *General Manager,* OpenMarket

Steven Spencer, *CEO,* Upoc Networks

TV on the Go

Leveraging Mobility to Meet Consumer Demand for Video Content

Wednesday, October 24, 2007
1:00 PM – 2:30 PM
Room 250

There is little question about America's appetite for video content. From hundreds of cable and over the air channels, to a growing variety of Internet-based video content, it is clear that when it comes to video content, Americans can't get enough. And as the original iPod did with music, the video iPod has helped demonstrate that America has an appetite for mobile video content as well. But how can mobile best leverage that demand and help satiate the market? This session will consider the ways in which mobile can help provide Americans with ubiquitous access to video content and add to the revenue stream being built around mobile content.

Moderator:
Ranjan Mishra, *Director,* Oliver Wyman

Speakers:
Michael Barlow, *CEO* Alcatel-Lucent PacketVideo Network Solutions

Albert Cheng, *EVP, Digital Media* Disney-ABC Television Group

Ray DeRenzo, *VP of Business Development* MobiTV

Gideon Gilboa, *WiMAX TV Product Marketing Manager,* NDS

Ron Lamprecht, *VP, New Media,* NBC Universal Cable

Jan Lezny, *VP, Business Development* MediaFLO USA Inc.

Clint Stinchcomb, *EVP & GM,* Discovery Communications (Emerging Networks Group)

Maxing Mobile for Millennials

Wednesday, October 24, 2007
1:00 PM – 2:15 PM
Room 270

Today's Internet-savvy teenagers and 20-somethings barely understand faxing, but are addicted to texting and social networking. These Gen Y'ers don't just watch content—they create and share it as a regular part of their day. So how do companies reach this powerful group of consumers? Is the growth of mobile among this group subsiding? How can

the market create experiences that surpass the Internet, yet fit the format and mobility of handsets? This panel will provide executable strategies for engaging the youth market in a way that generates participation as well as revenue.

Moderator:
Antony Bruno, *Exec. Dir, Digital/Mobile* Billboard Magazine

Speakers:
Howard Handler, *Chief Marketing Officer* Virgin Mobile USA

Alice Kim, *Vice President of Carrier Relations and Wireless Distribution,* MTV Networks Mobile Media Group

Paul Palmieri, *President & CEO,* Millennial Media

Jack Philbin, *President & Co-Founder,* Vibes Media

John Puterbaugh, *Founder,* Nellymoser

Investing With Confidence

Venture Capital Spending

Wednesday, October 24, 2007
2:30 PM – 3:45 PM
Room 270

According to numerous sources, overall venture capital funding for the first quarter of 2007 is down. After listening to this panel discuss the evaluation of mobile web 2.0, effective marketing strategies for wireless, MVNO financial viability, new VC opportunities for the future, and a host of other issues, attendees might decide the outlook for mobile remains incredibly active and full of promise. Don't miss the chance to hear this panel of experts in venture funding explore where the exciting early stage investment prospects remain within the mobile environment.

Moderator:
Rajeev Chand, *Managing Director and Senior Equity Research,* Rutberg & Company

Speakers:
Tim Chang, *Principal,* Norwest Venture Partners

Thomas Huseby, *Managing Partner,* SeaPoint Ventures

Matt Murphy, *Partner,* Kleiner Perkins Caufield & Byers

Tom Wheeler, *Partner,* Core Capital Partners

Richard Wong, *Partner,* Accel Partners

Personalized Interaction

Issues in Mobile Advertising

Wednesday, October 24, 2007
3:30 PM – 5:00 PM
Room 250

Mobile marketing has proven to be a powerful channel to communicate with any audience. Mobile is currently the fastest growing advertising channel available to marketers increasing 30% year-over-year. Learn how this medium not only targets the consumer directly, but also achieves a high level of interaction, because people never leave home without their mobile phones and rarely switch them off. Gain greater insight into why the use of mobile marketing is also considered an effective communication tool for advertisers since it creates a personalized, one to one relationship between a brand and a consumer. This session focuses on the personal, portable, and controllable aspects of mobile from marketing and advertising perspectives and also addresses what the industry must do to protect the space for carrier and brand alike.

Moderator:
Ted Cohen, *Managing Partner,* TAG Strategic

Speakers:
Mike Baker, *CEO,* Enpocket

Tom Burgess, *CEO,* Third Screen Media

Brian Cowley, *CEO,* Ad Infuse, Inc.

Thomas Ellsworth, *President and COO,* GoTV Networks

Mitch Feinman, *SVP,* Fox Mobile Entertainment

Omar Hamoui, *CEO,* Admob

Scott Silk, *CEO & President,* Action Engine Corporation

The Quest to Discover Mobile Content

Wednesday, October 24, 2007
4:00 PM – 5:15 PM
Room 270

Consumers are showing more and more interest in accessing content via mobile devices, and have demonstrated a willingness to pay for the mobile content they consume. The establishment of unified platforms and tools to organize and manage the mobile content experience, including the ability to discover "hard to find" content will certainly propel a richer user experience. Currently, content discovery is mired in several challenging issues. Ongoing debates include the comparison of ODP "on device portals", versus WAP (mobile apps vs WAP), iMDM "integrated mobile device management", mobile search, and other issues, all vying for the title of "tool best suited for discovery". This panel will explore these issues and also attempt to identify solutions surrounding the overall discovery of mobile content.

Moderator:
Monica Alleven, *Editor, Wireless Week*

Speakers:
Douglas Edwards, *EVP/Chief Marketing Officer* Handmark

Randy Eisenman, *President and CEO,* Handango, Inc.

Tom Maguire, *Vice President,* Kyocera Wireless Corp.

Dan Olschwang, *President and CEO,* JumpTap

Tom Trinneer, *Vice President,* SNAPin Software

Mobile Data 2.0 Track

Sponsored by KPMG

The Mobile Data 2.0 Track provides a window into future mobile development. The track examines new innovation that is available through wireless vehicles such as mCommerce, eMessaging, and location-based services. Special emphasis is placed on the cross-ecosystem coordination needed to drive more complex usage and deeper adoption of mobile goods and services and enhancement of lifestyle productivity. This focus will help attendees see the future more clearly given the rapid pace of technological developments in wireless.

Topics:

Commercializing Location Based Services

Tuesday, October 23, 2007
1:00 PM – 2:30 PM
Room 200

Location-based services (LBS) that are riding on mobile networks offer unlimited opportunity to providers and customers alike. However the uptake for LBS is slower in some areas than expected due to a host of issues, from privacy and security to application usability. What are the expectations from users for these types of services? What are providers doing to meet those expectations and concerns so that market potential can be met? This session discusses the current challenges facing those companies working to commercialize location based services.

Moderator:
Tracy Ford, *Editor/Associate Publisher*
RCR Wireless News

Speakers:
Sam Altman, *CEO,* loopt Inc.

Walt Doyle, *CEO,* uLocate

NAVTEQ, TBD

HP Jin, *CEO,* TeleNav

Darren Koenig, *Director, Wireless, Internet & Telecom*
Tele Atlas

Steve Petilli, *EVP Bus Dev & Product,* Networks In Motion, Inc.

Are Data Exchange Standards Necessary for the Growth and Profitability of the Digital Content Market?

Tuesday, October 23, 2007
3:30 PM – 5:00 PM
Room 200

As the mobile content marketplace continues to grow, trust-based reporting relationships are increasingly strained and do not allow for economies of scale across vendor relationships. Since every Content Owner is working hard to reshape their distribution model and reach new audiences, could efficiencies be gained from adopting common data exchange standards between the relevant parties in the digital content ecosystem? This session will explore the pros and cons of a standardized reporting system and the role it could play in bolstering profitability in the wake of maturing traditional businesses.

Moderator:
Charles Brower, *Director, Information, Communications & Entertainment,* KPMG

Speakers:
Jill Braff, *SVP, Worldwide Marketing, GM of Americas*
Glu Mobile

Bill Diggins, *Head of Digital Entertainment*
Qpass - Amdocs Digital Commerce Division

Scott Forbes, *Vice President, Service Transformation Subscriber Integration Practice,* Alcatel-Lucent

Robert Hyatt, *Executive Director,* AT&T Mobility

Dennis Quinn, *Executive VP, Business Development*
Turner Broadcasting System, Inc.

Christy Wyatt, *VP, Ecosystem & Market Development*
Motorola, Inc.

Enhanced Mobile Messaging

What's Beyond SMS?

Wednesday, October 24, 2007
1:00 PM – 2:30 PM
Room 200

The mobile phone is a communications tool, not just a voice-to-voice tool. Messaging is data communication. However, 'plain old SMS messaging' has limitations. The next generation

of messaging seems to incorporate pictures, voice, presence and real time communication. This panel will provide the view of Enhancements to Messaging that are currently available, what is being developed, and what the future may look like for communication via a message.

Moderator:
McAdory Lipscomb, *Sr. Dir., Global Marketing,* Accenture

Speakers:
Jeff Armantrout, *Sr. Manager, Messaging,* T-Mobile

Chirag Bakshi, *VP, Messaging,* VeriSign, Inc.

Skuli Mogenson, *Founder & Chairman,* OZ

Inderpal S Mumick, *CEO, Chairman,* Kirusa Inc.

Allen Scott, *General Manager,* NeuStar, Inc.

John Sims, *CEO,* 724 Solutions

Joe Sipher, *Co-Founder, Product & Marketing,* Pinger

mCommerce

What It Will Take to Become The Next Big Thing in Wireless

Wednesday, October 24, 2007
3:30 PM – 5:00 PM
Room 200

mCommerce—from mobile banking to contactless payments—has all the earmarks of a Killer Application: Convenience, Ubiquitous Devices, Deep Interest among all the players in the Value Chain. And yet, unlike eCommerce, which has taken off, mCommerce seems to be spinning its wheels in the US. This panel takes a look at the issues that are holding back the deployment of mCommerce services in the US and posits what must be done to get the marketplace rolling.

Moderator:
Karen Webster, *President,* Market Platform Dynamics

Speakers:
Nashina Asaria, *Director, Business Development,* QUALCOMM Wireless Business Solutions

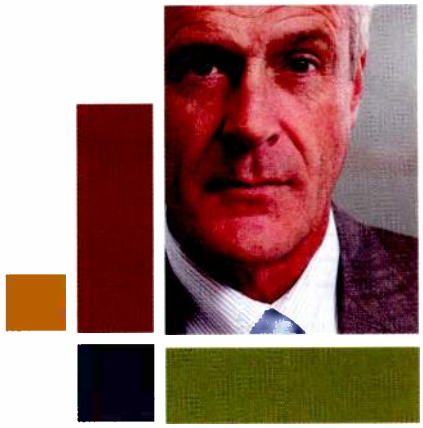
Kevin Dulsky, *Sr. Director & GM Mobile Payments,* PayPal

David Holmes, *Bus Dev. Mgr.,* NXP Semiconductors

Gerhard Romen,
Head of NFC Market Development, Nokia

Spencer White, *Director of Business Development,* AT&T Mobility

Pam Zuercher, *VP, Product Innovation,* Visa USA



CTIA's Policy Outlook Track continues to address the most important topics facing the wireless industry and policy decision makers. For the latest updates on guests and panelists of the Policy Outlook, please check www.ctia.org/wirelessIT

Topics:

Plenary

Wireless Industry Policy Hot Topics

Tuesday, October 23, 2007
2:00 PM – 3:00 PM
Room 114

Key Federal and State regulators will discuss policy hot topics and will answer questions about what policies they think will best spur the wireless industry's continued growth, innovation and evolution.

Moderators:
Chris Guttman-McCabe, *Vice President, Regulatory Affairs,* CTIA
K. Dane Snowden, *Vice President, External and State Affairs,* CTIA

Making the Universal Service Fund Work for Wireless

Wednesday, October 24, 2007
1:30 PM – 2:30 PM
Room 114

Representatives from industry, as well as key decisionmakers, will discuss how best to fulfill policymakers' goal of advancing mobile wireless deployment to high-cost, rural areas, in light of proposals to change universal service funding for wireless carriers.

Moderators:
Paul Garnett, *Assistant Vice President, Regulatory Affairs,* CTIA
Lisa Zaina, *Assistant Vice President, State Regulatory Affairs,* CTIA

Policy Outlook Track

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Market Realities

Wednesday, October 24, 2007
3:00 PM – 4:00 PM
Room 114

Key policy makers will discuss the realities of consumer behavior and the effect of market power in a competitive landscape along with a review of the inherent differences and tensions in Federal and State jurisdictional oversight of competitive markets.

Moderators:
K. Dane Snowden, *Vice President, External and State Affairs,* CTIA
Gerry Keegan, *Director, State Legislative Affairs,* CTIA

Plenary

Wireless and Public Safety, Building On Existing Public-Private Partnerships

Wednesday, October 24, 2007
4:30 PM – 5: 30 PM
Room 114

Wireless carriers and Public Safety entities have long partnered in the provision of various wireless services. At the same time that interested parties may seek to pursue a national broadband Public Safety network in earnest, commercial carriers and government must resolve important questions regarding emergency alerts, E911 and CALEA. Panelists will discuss next steps and answer questions implicated by these and other policy questions.

Moderators:
Lori McGarry, *Director, External Affairs,* CTIA
Brian Josef, *Director, Regulatory Affairs,* CTIA

Best

IT: Mobilizing the Enterprise

Enterprises in the corporate, government and public safety sectors are looking to do some unwired business. It's been a huge year for mobile enterprise applications, as carriers and their enterprise prospects look to move past the basics of untethering their workforce from wireline constraints.

Among some of the trendy enterprise applications, Verizon Wireless recently launched its Backup Assistant service, one of the many new applications on the market to help enterprise customers securely manage and back-up their mobile contact lists to avoid losing the information through glitch or theft. Backup Assistant does so by saving the contact list to a secure web site, and automatically updating the redundant list with changes as necessary.

AT&T, meanwhile, announced some advances at the small business end of the market, announcing a mobility bundle specifically designed for that segment. Sprint, for its part, has kept pushing push-to-talk into new places across its network footprint.

Some enterprise-related segments, such as public safety, municipalities and the general government market, continue to be proving grounds for the latest mobile applications. GPS and other location-based technologies continue to evolve to give public safety outlets a better fix on critical information need in emergency situation. Location-based services also have been adapted for the enterprise, to enable applications such as sales force automation and inventory tracking. The mapping information that feeds location-based applications has become a star in its own right.

Municipal Wi-Fi was a big trend of recent years, promising efficient broadband for government offices and applications, as well as public consumption, but now it's proving not to be the answer for unwiring many municipalities. That could give new mobile broadband and WiMAX technologies and applications greater efficacy in the municipal market opportunity.

Look for IT to make a big splash early on at this fall's CTIA WIRELESS I.T. & Entertainment show, as Microsoft CEO Steve Ballmer promises to discuss a major new enterprise announcement from the software giant during his Day One keynote. Other educational content on the agenda will keep the enterprise theme going: The Smartphone Summit, co-located with the big event in San Francisco, will hot on trends running across both the enterprise and entertainment spaces.

For enterprise, issues such as workforce mobility, mobile access security, applications convergence, push e-mail and location-based services either using GPS or other technology continue to be the hottest applications, and the Smartphone Summit has individual sessions addressing each area. Another Smartphone Summit session will seek to establish the current ROI for investing in an enterprise mobility program. NAVTEQ will be hosting its NAVTEQ Connections 2007 conference at the show, and other location and mapping companies, such as Garmin USA, MapInfo, deCarta and ESRI will be mapping out new directions for these increasingly popular applications. The show also will feature the Enterprise Mobility Pavilion, enterprise mobility conference tracks and the M2M Zone focusing on machine-to-machine communications for vertical enterprise markets.

As the world becomes more and more unwired, the enterprise environment is likewise keeping pace and fast becoming a hotbed of mobile application development and deployment.

# of Both Worlds

Entertainment: The Disconnected Consumer

Social networking can be a very entertaining series of applications for mobile consumers seeking fun with a sense of community, and the trend has mobilized its way into the wireless sector. At the CTIA WIRELESS I.T. & Entertainment event, Facebook co-founder and vice president of engineering Dustin Moskovitz will do the Day Two keynote, talking about the importance of open platforms for getting a variety of mobile content and applications to mobile user communities. At the show, BLStream, a provider of mobile blogging solutions, is one to watch for in the community space.

The M-tertainment Pavilion and mobile entertainment conference tracks will be other places to find out what's new in mobile entertainment applications. Mobile video continues to mature, but one of the newest things in mobile video is broadcast video. Verizon Wireless, which launched broadcast video service through MediaFLO earlier this year, has continued to expand both market availability and programming offerings. The carrier recently announced a broad slate of live college football offerings throughout the fall.

While broadcast gets bigger, Sprint, an early unicast video pioneer, is now focused on rolling out the first cities for its WiMAX-based 4G offering. Still, it also has find time to push forward innovative video-related applications like remote DVR scheduling and video-on-demand. Also keep an eye on GoTV Networks, one of the up-and-coming companies to watch in mobile video.

Mobile music also continues to be a vibrant arena. The most notable recent announcement was the new partnership between Verizon Wireless, MTV and RealNetworks to develop new music offerings for VCast.

Mobile banking and payments represents one of the busiest areas consumer segments. At last spring's CTIA WIRELESS 2007 show in Orlando, the industry witnessed the first wave of agreements between mobile carriers and banking firms to enable a variety of secure banking applications. More recently, carriers have begun adding more banking partners to increase availability to a larger percentage of their customer bases.

Then there's the increasingly popular mobile gaming sector. Digital Chocolate CEO Trip Hawkins will be among the other speakers at the show. Gaming has suffered through fits and starts as a mobile application, but it may finally be on the right track as developers have been able to understand what kinds of games work best on mobile devices. Expect Hawkins to discuss this progression as well as the future of 3-D mobile gaming, an application evolution likely to be the subject of great discussion in the near future. And if you're looking for a new company to check out on the mobile gaming front, try Big Blue Bubble.

Mobile marketing and advertising is another application area whose viability is being viewed with increasing certainty. Technologies for campaign management and distribution of marketing and advertising programs via mobile are very popular. Another co-located conference called Marketing-The Mobile Channel will take a closer look. Meanwhile, exhibitors such as Air2Web, Bango, Enpocket, iLoop, AdMob and Cellfire, among others will have key solutions on display.

Whether it's movies or music, money or games, it's clear that the consumer world has cut the cord.

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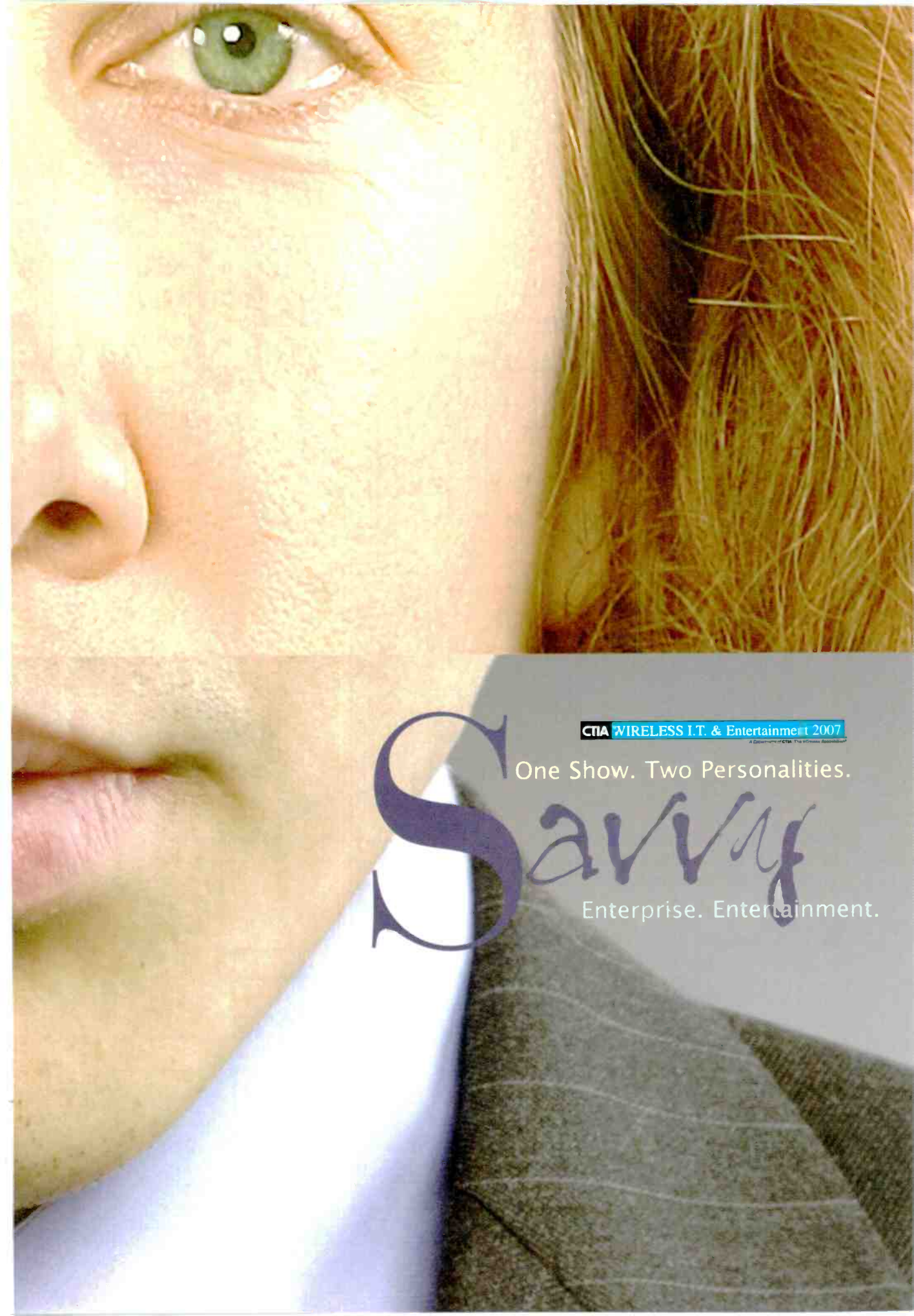
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Enterprise Mobility Pavilion

Featuring cutting-edge innovators and enterprise solutions providers in the mobile and wireless industries, the Enterprise Mobility Pavilion marks its sixth appearance this fall at CTIA with a focus on exciting new Smartphone technologies.

The Pavilion covers all platforms of wireless devices and their related hardware, software, and accessories. If you are looking for the latest mobile enterprise solutions to enhance the productivity and profitability of your business, the Enterprise Mobility Pavilion is the place to be on the CTIA exhibit floor this fall in San Francisco.

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- Clickatell
- GeoMicro, Inc.
- Mobile Data Now
- NetProSys, Inc.
- Symbian

M2M Zone™

SOLD OUT!

The M2M Zone™ will feature exhibitors with pioneering wireless machine-to-machine (M2M) services and products.

The next evolution in communications, M2M solutions include wireless remote control and monitoring of fixed and mobile devices for enterprise and consumer markets. In fact, microchips that can communicate location, status and other characteristics are already growing dramatically as businesses realize the effect that device connectivity can have on their bottom lines. The M2M Zone is where network operators, application designers, hardware manufacturers and end users come together to showcase and look to deploy exciting wireless M2M communications.

For more information, go to www.m2mzone.com.

Participating companies include:

- Aeris
- InnoPath Software
- Janus Remote Communications
- Jasper Wireless
- KORE Telematics
- Kyocera Wireless Corporation
- LLeida Networks Serveis Telematics, S.L
- Motorola—M2M Wireless Modules
- Numerex
- RACO Industries, Inc.
- Siemens Wireless Modules
- Sierra Wireless
- Telit Wireless Solutions
- T-Mobile
- Wavecom, Inc
- Wyless

M-tertainment Pavilion

Sponsor MEF

Showcasing the hottest mobile trends for watching live TV or downloading music, movie trailers, cutting-edge video games and much more!

The mobile entertainment market is surging with new and untapped revenues, and CTIA has created a place for up-and-coming companies to spotlight their services. This is a one-stop shop so you can stay on top of your game.

Contact a sales representative today for more details:

Companies A–L
Mike Greeson, mgreeson@ctia.org, 202.736.3682.

Companies M–Z
Karen Leon, kleon@ctia.org, 202.736.3887.

Participating companies include:

- Absolute Quality, Inc.
- AdMob
- APT Ltd.
- Coding Technologies
- Emdigo, Inc.
- European Software Games
- GEODESIC Information Systems
- GOFRESH GmbH
- Hands-On Mobile, Inc.
- iVision Mobile
- MobiBase
- Mobile Ethos PTE LTD.
- Mobiqa Ltd
- Mobot, Inc.
- Nellymoser
- NewBay Software Inc.
- PlayPhone, Inc.
- Plutolife
- QSound Labs, Inc.
- QuickPlay Media Inc
- SolovatSoft, Inc.
- Sound Ideas
- Sports Network
- STATS LLC
- Textopoly Inc
- thePlatform
- UK Trade & Investment
- Wapple.net

Ontario-Canada Pavilion

Ontario is Canada's high technology heartland—home to some 6,000 hardware, software and service firms.

At CTIA, a delegation of Ontario companies is exhibiting in booth 849 in a visit coordinated by the Consulate General of Canada in Los Angeles and the Government of Ontario.

For more information, please contact Mauricio Ospina, Area Director USA - ICT sector, at mauricio.ospina@edt.gov.on.ca, 416.325.6151

Participating companies include:

- Amika Mobile Corporation
- Big Blue Bubble
- Datawind Net Access
- FieldWorker Products Ltd.
- Gesturetek
- GoTV Networks
- Independent Digital Licensing Corporation
- iThentic
- Solutions Into Motion
- TACS
- Voxtone Communications

UK Pavilion by East of England International

East of England, the region immediately north of London, is at the forefront of research and innovation in technology.

It has the largest number of R&D Engineers per capita in the UK and spends three times the national average on commercial research. You can meet with companies from the East of England at stand 1639 where you can also talk to staff from East of England International to find out more about the region's benefits.

For more information, please contact Alice Boulton, Marketing Manager, at aliceboulton@eeia.com, +44 (1) 223450450

Participating companies include:

- Greater Cambridge Partnership
- MovieStorm

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Starting several weeks before the event, myCTIA show begins to alert you via email about people, products, and knowledge precisely matched to your objectives. Your "You-Based Event Report" is built for you week-by-week by myCTIA show and is accessible in your myCTIA show account.

Build your own perfect show. Use your myCTIA show search engine to quickly find everything you're looking to help you plan you time at the top event for the Wireless Industry.

Building CTIA WIRELESS I.T. & Entertainment 2007 around you!

Create your account at www.ctia.org/wirelessIT

myCTIA365

MyCTIA365 is the online business tool for professionals in the wireless industry.

It is for suppliers and buyers of wireless devices and accessories, wireless networking equipment and systems, wireless applications, site infrastructure equipment, and other wireless industry services.

This site is designed with one of the world's largest searchable directories of easy-to-access supplier listings and product listings, industry news and knowledge, and other relevant content to make the time you spend here productive.

If you are a supplier looking to sell to buyers, there is no better way to reach them than MyCTIA365. This is where your customers will be looking. The site's large volume of thousands of wireless industry supplier and product directory listings, deep wireless industry knowledge content, and powerful personalization solutions are making it a major destination for people searching the Internet for wireless solutions. The benefits of being seen here and looking here will grow exponentially.

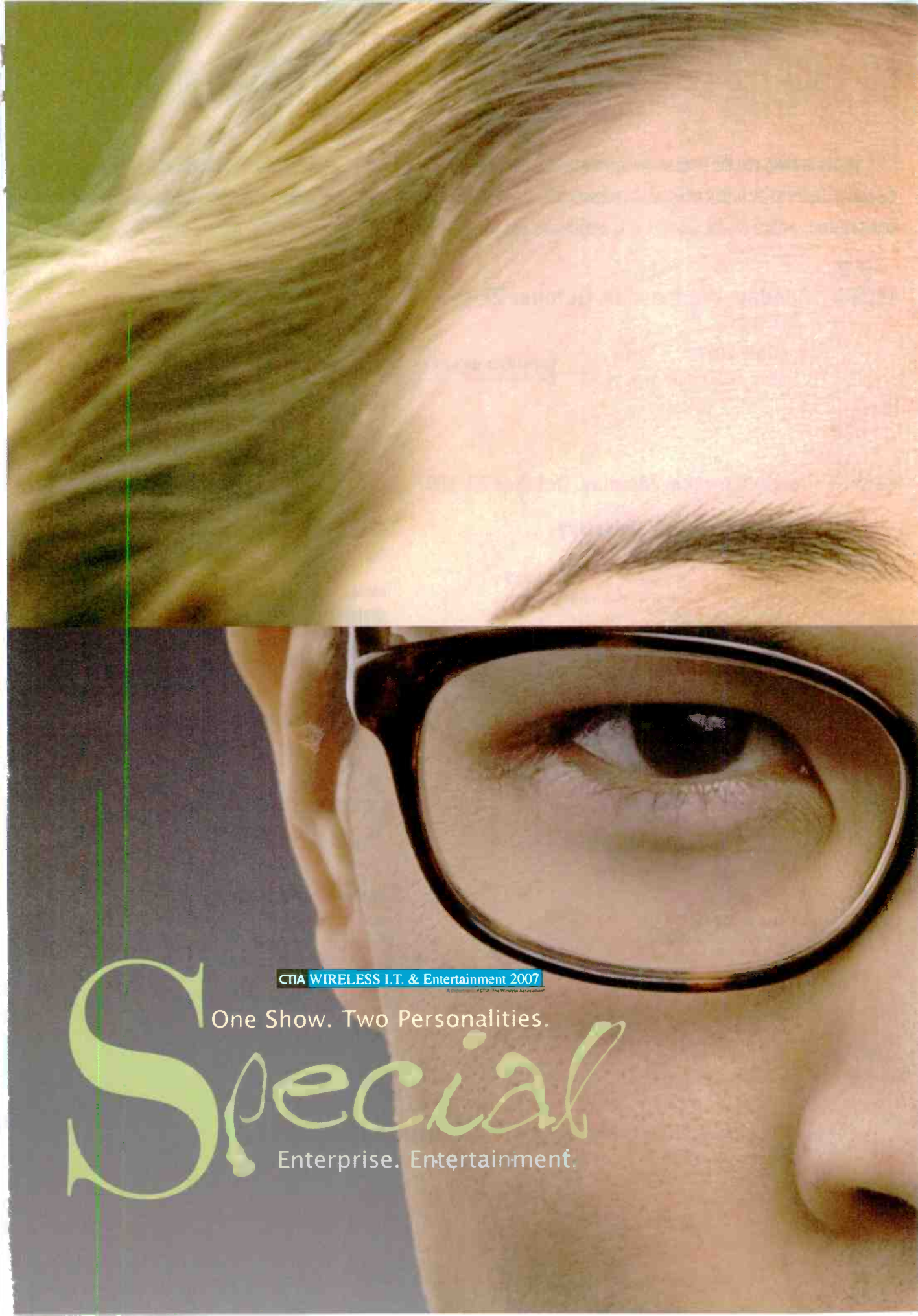
www.myctia365.com

MyCTIA365 is powered by

CTIA
The Wireless Association®

and its technology partner,

BDMetrics


CTIA WIRELESS I.T. & Entertainment 2007
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CO-LOCATED CONFERENCES & SPECIAL INTEREST SEMINARS

CTIA strives to bring you the most comprehensive educational experience as possible, providing the latest updates and briefings on the hottest topics today. In that effort, CTIA partners with key organizations to deliver unique and relevant content in the areas of mobile entertainment, venture capital, wireless data applications and more.

Monday–Wednesday, October 22–24, 2007

4GMF 2007

More information on page 27

FOURTH GENERATION MOBILE FORUM (4GMF)
Simplicity. Personality. *Reshaping the mobile future - a Global Initiative*

Pre-Conference: Monday, October 22, 2007

Andrew Seybold University

More information on page 28

ANDREWSEYBOLD UNIVERSITY
SCHOOL OF WIRELESS MOBILITY

Enterprise Mobility

More information on page 30

at&t Your world. Delivered.

accenture *High performance. Delivered.*

Marketing—The Mobile Channel

More information on page 31

CTIA The Wireless Association®

Mobile Entertainment Live!

More information on page 32–33

Billboard The Reporter mobile entertainment LIVE!
THE OFFICIAL EVENT OF CTIA

NAVTEQ Connections 2007

More information on page 33

NAVTEQ CONNECTIONS 2007 The Power Summit for Location.

Smart Phone Summit 2007

More information on page 34

SmartPhone SUMMIT

Day One: Tuesday, October 23, 2007

Deloitte's Wireless Fast 50 Awards Ceremony

More information on page 29

Deloitte.
2007 Wireless Fast 50

2007 Fourth Generation Mobile Forum (4GMF)

Monday–Wednesday, October 22–24, 2007
9:00 AM – 5:00 PM
Moscone Center & Marriott

FOURTH GENERATION MOBILE FORUM (4GMF)
Simplicity. Personality. *Reshaping the mobile future - a Global Initiative*

Sponsored by: Intel Corporation, Oracle Corporation, Texas Instruments, Qualcomm & Sieneon

www.4GMF.com or **www.4GMF.org**

Anytime. Anywhere. All at once. Explore the full spectrum of next generation wireless mobile opportunities—from handheld devices to mobile content to back-end technologies—as forward-thinking investors, corporate development officers, analysts and executives convene at 2007 Fourth Generation Mobile Forum (4GMF).

The cutting-edge wireless and mobile communication systems that are captivating users today are largely defined by the technology inside, particularly the hardware components and software IPs powering new gee-whiz capabilities. This technology is evolving quickly, making it imperative for leaders like you to accurately track the products, trends and opportunities shaping the future.

Whether you're seeking capital or seeking to invest it, or just looking to gain insight into the latest innovations in wireless mobile technologies, you can't afford to miss the industry's premier data-driven examination of emerging 4G wireless mobile technologies and the companies behind them. This 4GMF event features keynotes with top executives from world's leading wireless mobile players, as well as presentations from the most promising wireless mobile start-ups.

WiMax technology, IMT-Advanced technology, Mobility convergence technology and next generation iPhone technology are the focused subjects of this year's summit. The forum is designed to help technology innovators better develop and market successful products and services for the industry.

4GMF will become the flagship and authoritative global forum in promoting the truly service oriented mobile communication architecture and infrastructure for the convergence of multiple air interfaces or radio transmission technologies with focuses on users' increasing demands of simplicity and personality.

The 4GMF'2007 keynote topics include, but are not limited to:

- Call for action: Open US Mobile Communication Markets
- Simplicity and Personality: SOS from the mobile Users
- 4G is to converge with 3G, not to compete with 3G
- Mobile WiMax: Are you ready for US 4G mobile offerings?
- Next Generation Internet: Wireless the IP Mobility
- iPhone Evolution: design the mobile convergence platform
- How to deliver cost-effective multimedia to 4G phones?
- Wall Street responses to global 4G mobile movement
- 4G Law: Service-oriented vs. Transmission-specific
- China 4G Roadmap from TDD-SCDMA to TDD-OFDMA to TDD-OWA
- 4G Mobile: Benefits both Computer and Telecom industry
- 4G IPR: will Qualcomm model be repeated in the 4G Era?
- Global Mobile: Where is mobile convergence tipping point?

4GMF'2007 keynote and featured speakers comprise top executives of world's leading mobility and wireless players, authorities and investors including FCC, Intel, Oracle, Texas Instruments, JP Morgan, Ericsson, Qualcomm, Sequoia Capital, Sony Pictures, KPCB, Yahoo, Kauffman, Bechtel, NTT DoCoMo, NEC, Nokia, Sprint, Symbian, IBM, Adobe, HP and Microsoft, etc.

The future is not to be predicted, it is to be created. 4GMF sincerely invites you to this prestigious global 4G technology forum and hope you'll add your leadership to these important discussions.

For details of 4GMF'2007 and to register, please visit: www.4GMF.org or www.4GMF.com.

PLEASE NOTE: ***The 4GMF registration pass includes admission to CTIA WIRELESS I.T. & Entertainment 2007 Keynotes and Exhibit Floor. For any registration questions, please contact steve@delson.org or contact@4GMF.org.***

SPECIAL INTEREST SEMINARS

Andrew Seybold University presents *School of Wireless Mobility*

Monday, October 22, 2007
9:00 AM – 5:00 PM
Moscone Room 122

Presented by

ANDREWSEYBOLD UNIVERSITY
SCHOOL OF WIRELESS MOBILITY

Increase your Wireless IQ with ANDREW SEYBOLD UNIVERSITY

For twelve years, ANDREW SEYBOLD UNIVERISTY–School of Wireless Mobility has provided executives, technologists and other industry participants an in-depth, unbiased view of wireless technologies and applications in one-day educational seminars. Led by Andrew Seybold, a renowned wireless industry expert, this completely updated comprehensive seminar reveals important new research and insights in all aspects of the wireless mobility industry. This is a must-take course for everyone, whether you are new to wireless or a seasoned veteran.

DESCRIPTION

ANDREW SEYBOLD UNIVERSITY is a full-day seminar divided into two sessions. The morning session delves into wireless technologies and operators within the United States and throughout the world. The afternoon session zeros in on the operating systems and applications fueling the demand for services that go well beyond voice.

In the morning you will learn about wide-area, local-area and personal-area wireless communications technologies, devices and technology advances that have been implemented as well as those waiting in the wings to be deployed.

In the afternoon you will explore the elements of wireless data from both the operators' and customers' vantage point as you review consumer and business applications, projections for applications of the future, content and technologies, and the applications wireless operators believe will drive the increased adoption of wireless services.

WHO SHOULD ATTEND?

- Industry executives and entrepreneurs focused on wireless convergence
- Leaders of companies migrating to wireless and workforce mobility
- Neophytes and business professionals new to wireless
- Technology evaluators and implementers
- Marketing and sales professionals

WHAT YOU GET:

- An intensive daylong program with opportunities to network with the experts
- A well-rounded education in current technologies, applications and related services
- A global wireless industry perspective—historical, present and on the horizon
- Complex issues conveyed in plain language in an engaging style

HOW YOU BENEFIT:

- You will have solid, relevant facts and unbiased insights
- You will make more informed short- and long-term decisions
- You will put the power of wireless mobility to work for your company and your customers
- You will gain a competitive business advantage

Sponsor

SiRF

Wireless WEEK

Registration Fee: $349

PLEASE NOTE: *There is a separate registration fee for Andrew Seybold University and it is NOT included in the Conference Pass or Smart Pass registration packages. The Andrew Seybold University fee also includes admission to all keynote sessions and access to the exhibit hall. Please see registration form for details.*

Deloitte Wireless Fast 50 Awards Ceremony

COME CELEBRATE THE WIRELESS FAST 50!

Tuesday, October 23, 2007
2:30 PM
Moscone Gateway Ballroom

Deloitte.
2007 Wireless Fast 50

In Partnership with CTIA The Wireless Association®

OPEN TO ALL REGISTERED ATTENDEES!

Please join us as we celebrate the first annual Deloitte Wireless Fast 50 on October 23, 2007 at 2:30pm. Be there as we unveil the first ever Wireless Fast 50 winners and their rankings on the **CTIA Keynote Stage** in the **Moscone Gateway Ballroom.**

The Wireless Fast 50 is a subcategory of the Technology Fast 50, recognizing the 50 fastest growing companies in the wireless industry. In order to be eligible, a company must own proprietary wireless intellectual property or proprietary wireless technology that contributes to a significant portion of the company's operating revenue, or devotes a significant proportion of revenue to research and development of technology.

The Wireless Fast 50 is a global program that is intended to capture the full breadth of the wireless industry's entrants and innovations. You will be surprised and intrigued to find out who among your colleagues and competitors made the list!

You are also invited to stop by the **Wireless Fast 50 Pavilion** located in Booth 221 to check out the booths of some of the Wireless Fast 50 winners as well as to register for cool give-aways including an exclusive **Porsche Motorsport driving school excursion,** including luxury accommodations, in Birmingham, Alabama. A **Porsche Racecar** will also be displayed in the Wireless Fast 50 Pavilion, so stop by to talk shop and find out how wireless technology enhances today's world of racing.

For more information on the Wireless Fast 50 program, please contact us at USWirelessFast50@deloitte.com or visit the website at www.fast50.com.

Sponsors oneSPORT **Porsche Motorsport**

REGISTER NOW TO EXPERIENCE THE NEXT GENERATION OF WIRELESS DATA AT WWW.CTIA.ORG/WIRELESSIT

SPECIAL INTEREST SEMINARS

Enterprise Mobility: Enabling Your Business to Run Better Through Mobility

Monday, October 22, 2007
12:00 PM – 6:00 PM
Moscone Room 250

Powered by at&t Your world. Delivered. accenture *High performance. Delivered.*

Forever forward, mobility in the workplace will be a key driver in how businesses receive and deliver information within their own organizations as well as to their customers/constituents, partners and suppliers.

Expectations are that the technology is only going to continue accelerating the steep growth of mobility for all industries including Financial and Insurance Services to Healthcare, Government, Media/Entertainment, Utilities, Transportation, Consumer Products and of course High-Tech to name a few. But, it is no longer just about the technology itself—the driver is enhancing business through the mobile processes. Is your organization ready? Do you have the solution in place for this and the next wave of streamlined communication?

In this CTIA Special Interest Seminar, *Enabling Your Business To Run Better Through Mobility,* presented by AT&T and Accenture you will hear from mobility experts and leaders who will share the secrets of Enterprise Mobility enablement. Additionally, you'll hear from key leaders and influencers in target industries who have architected and deployed integrated mobile solutions with powerful results. You will learn about how the processes are the key to success for greater efficiency and streamlining of your workforce's day- to-day communication.

If you are responsible for streamlining operations, identifying efficiencies in your communication eco-system or looking for new ways to ensure connectivity that enables the greatest level of production and service for your customers and key constituents, then this seminar is for you.

Learn how to:

- Drive measurable value through mobility with processes to improve company operations and bridge the gap between on-site and remote employees.
- Access information such as corporate data, Web, intranet and office e-mail in real-time.
- Enhance connections among dispersed employees to products, assets and customers.
- Remove barriers (security, networks, devices, etc.).
- Create a more direct connection between workforce and customer/constituents, increasing confidence in the capabilities of your company to improve the customer experience.

The time to go mobile is now. Don't miss this opportunity to stay competitive and bring your business into the future with mobility, register now.

Registration Fee: $395

PLEASE NOTE: *There is a separate registration fee for Enterprise Mobility and it is NOT included in the Conference Pass or Smart Pass registration packages. The Enterprise Mobility fee also includes admission to all keynote sessions and access to the exhibit hall. Please see registration form for details.*

Marketing – The Mobile Channel

Monday, October 22, 2007
9:00 AM – 5:30 PM
Marriott Golden Gate A

Presented by CTIA The Wireless Association®

MORNING SESSIONS

Keynote Message – Mobile is much more than voice as today's wireless handsets are multifaceted tools offering intensely powerful applications with a direct link to wireless consumers. Today's keynote presenter examines why this utility is adopted as an additional channel in the communications mix for clients and brands.

mCommerce – Currently utilized for the sale of mobile phone ringtones and games, mCommerce is increasingly used to enable payment for more complex products and services. This panel of experts will discuss how mobile is the thread to link merchandise to consumers through traditional media.

Search Engine Marketing – Demand is heavy for more advanced content, a richer browsing experience and increasing ease of use. At issue is the discovery of the content in an increasingly complex environment. This panel will examine ways to minimize the time required to find information.

Sales Channels, Mobile – Utilizing the right mix of sales channels is critical to serving multiple market segments with diverse buying characteristics. In this session we will explore the capabilities of mobile to provide realistic sales opportunities.

AFTERNOON SESSIONS

Mobile Advertising – Mobile marketing spending is on the rise (expected $1.3 billion by 2009). Marketers clearly need to use multiple touchpoints and to take advantage of face-to-face opportunities. This session will examine the sustainability of this explosive growth and key factors for future success.

End Game, CSC Case Study – Innovative and highly effective campaigns include in-venue applications, advertising, cataloged consumer goods, and other content created specifically for mobile application. With this panel we will explore the hottest new ideas driving mobile interaction for agencies and brands.

Mobile Marketing Basics – Understanding the basics of mobile interaction is key to developing and implementing successful mobile applications. This session will include the basics principles of common short codes and text messaging.

Mobile Marketing IT – A number of technologies utilized to provide support and flexibility to applications turn a mobile device into a marketing tool able to connect with anyone, anywhere. This session will address current issues affecting the technology behind mobile and examine the advancement of new mobile solutions.

Carrier Perspectives – Wireless service providers must adapt to numerous market changes in order to remain competitive. What impact do these changes have on carrier strategy for mobile marketing? What is the future for mobile initiatives in US markets and what are the emerging trends? Hear how carriers are addressing the biggest issues in the industry.

Sponsors

ThirdScreenMedia · NEUSTAR · Cellfire · KNOWLEDGEWHERE · AdvertisingAge · Bluetooth SPECIAL INTEREST GROUP · cwta acts · mma mobile marketing association · RCRWireless News

Registration Fee: $349

PLEASE NOTE: *There is a separate registration fee for Marketing—The Mobile Channel and it is NOT included in the Conference Pass or Smart Pass registration packages. The Marketing—The Mobile Channel fee also includes admission to all keynote sessions and access to the exhibit floor. Please see registration form for details.*

SPECIAL INTEREST SEMINARS

Billboard The Hollywood Reporter **mobile entertainment LIVE!**
THE OFFICIAL EVENT OF CTIA The Wireless Association

MOBILE ENTERTAINMENT LIVE!
Conversations on Convergence
Hosted by Quincy Jones

Monday, October 22, 2007
8:00 AM – 6:00 PM
Moscone Esplanade Ballroom

For More Information, Visit: www.BillboardEvents.com

PROGRAM HIGHLIGHTS:

9:15 – 9:45 ..... Carrier Q&A
Mark Desautels, *VP, Wireless Internet Development,* CTIA–The Wireless Association
with
Mark Collins, *VP Consumer Data,* AT&T Wireless

9:45 – 10:15 ..... Content/Service Provider Q&A
Tom Wheeler, *Managing Director,* Core Capital Partners
with
John Zehr, *SVP Digital Video & Mobile,* ESPN

10:15 – 10:45 .... Disruptive Tech Q&A
Ted Cohen, *Partner,* TAG Strategic
with
Blake Krikorian, *CEO,* SlingMedia

11:15 – 11:45 .... After the iPhone Q&A

11:45 – 12:15 .... Mobile Marketing/Advertising Q&A
Evan Neufeld, *VP, Senior Analyst,* M:Metrics
with
Courtney Jane Acuff, *Director,* denuo (a Publicis Groupe Company)

12:15 – 12:45 .... Celebrity Q&A
Tamara Conniff, *Editor & co-Publisher,* Billboard
with
Quincy Jones

1:45 – 2:15 ..... Game Industry Q&A
Mark Ollila, *Director, Technology & Strategy, Games, Multimedia,* Nokia

2:15 – 2:45 ..... Music Industry Q&A
Antony Bruno, *Exec. Dir., Content & Programming, Digital/Mobile,* Billboard
with
Rio Caraeff, *EVP, eLabs/GM Universal Music Mobile,* Universal Music Group

3:00 – 3:30 ..... Film/TV Industry Q&A
Andrew Wallenstein, *Digital Media Editor,* The Hollywood Reporter

4:00 – 4:45 ..... Session A
Interactive Entertainment
Speakers:
Dorrian Porter, *CEO,* Mozes
Jon Vlassopulos, *VP Business Development, Strategic Planning & New Media,* Endemol
Alex Campbell, *Vibes CEO,* Vibes Media

4:00 – 4:45 ..... Session B
Off Deck: Opportunity vs. Obstacles
Moderator:
Frank Dickson,
Principal Analyst,
iSuppli

Speakers:
Brian Casazza, *CEO,* 9 Squared
Adam Sexton, *Chief Marketing Office,* Groove Mobile
Rajeev Raman, *Founder/CEO,* MyWaves
Scott Silk, *President & CEO,* Action Engine

..... Session C
Analyst Session
Top analysts from the industry's leading research firms will present exclusive data never-before seen until this session.
with
Telephia
and
NPD Group

5:00 – 5:45 ..... Session A
Attendees Choice:
The Big Mobile Entertainment Roundtable
Attendees will be able to choose panelists in advance and will be invited from the get-go to ask their most pressing questions directly to our experts.
Visit **www.mobileentertainmentlive.com** to vote on panelists as well as suggest others to recruit.

..... Session B
Social Networking
Anthony Batt, *Founder/President,* BuzzNet
Sam Altman, *CEO,* Loopt
Shawn Conahan, *CEO,* Intercasting

..... Session C
Business Models

Billboard mobile entertainment bash

IN ASSOCIATION WITH DYNETIC

6:30 – 8:30
RUBY SKYE
420 Mason Street

Don't miss the networking event of the year!
Live performance by **Josh Kelley**

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Corporate Sponsors

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Registration Fee: $499

PLEASE NOTE: *There is a separate registration fee for Mobile Entertainment Live! and it is NOT included in the Conference Pass or Smart Pass registration packages. The Mobile Entertainment Live! fee also includes admission to all keynote sessions and access to the exhibit hall. Please see registration form for details.*

NAVTEQ Connections 2007!

Monday, October 22, 2007
9:00 AM – 5:30 PM
Marriott Salon 9

NAVTEQ CONNECTIONS 2007 The Power Summit for Location.

OPEN TO ALL REGISTERED ATTENDEES!*

NAVTEQ, a leader in location and mobile navigation, is pleased to host NAVTEQ Connections 2007, an annual conference devoted to the convergence and advancement of location-enabled devices, software development and distribution.

Participants at this one-day event will have the unique opportunity to network with and hear from industry-leading developers, device manufacturers, carriers and solution providers for business, government and commercial solutions. Throughout the conference attendees will have the opportunity to network and gain valuable insights on the latest in location and mapping technologies

The conference offers attendees the opportunity to personalize their day, attending the sessions most meaningful to their interests. Informative presentations and interactive panel discussions will highlight the latest information regarding:

- Insights on application development for wireless technologies presented by top device manufacturers and platform companies
- The latest market research on wireless demand for location content
- User-generated community content and technologies powering new location content in real time
- Top venture capitalists outline of the current state of commercialization and launch of wireless applications.
- Technical sessions on application formats as well as location content on the horizon
- Insights on the development of applications utilizing the latest tools and devices

And with hands-on location application demonstrations from top developers as well as a networking cocktail reception, the NAVTEQ Connections 2007 is an event not to be missed.

Who Should Attend

- Developers & Coders
- Operators & MVNOs
- OEMs
- Aggregators & integrators
- Retailers
- Venture capitalists
- Industry Analysts

To register for NAVTEQ Connections 2007 or for more information visit www.navteq.com. Please send your questions to NAConnections@navteq.com.

***PLEASE NOTE:** *Attendance is complimentary for all attendees who pre-register for event and is subject to space availability.*

SPECIAL INTEREST SEMINARS

Smart Phone Summit 2007

presents

Smartphone Enterprise Solutions

Monday, October 22, 2007
9:00AM – 6:00 PM
Marriott Golden Gate C

Presented by SmartPhone SUMMIT

Sponsored by symbian

hp invent · Bluefire Security Technologies · LAPTOP · SMARTPHONE

Smartphone Summit 2007 Presents 'Smartphone Enterprise Solutions' - An exclusive conference event taking place October 22, 2007 in San Francisco, CA with CTIA, and dedicated to bringing you the top Smartphone based Enterprise Solutions from all Smartphone OS platforms including Symbian, Microsoft, RIM, Palm, and Linux.

Throughout the conference attendees will be given the inside track on the ways their business can benefit from the latest Smartphone technologies, solutions, hardware, software, and accessories. The focused attendee demographic includes enterprise executives as well as wireless developers and I.T. professionals. The Smartphone Summit is additionally a symposium for wireless industry leaders, insiders, and analysts to network while experiencing the cutting edge future of smartphone mobile devices and wireless solutions.

Each year the Smartphone Summit conducts in-depth industry research and consultation with the leaders in wireless & mobility to bring you cutting edge conference topic presentations and discussions. In all more than 75 speakers will present at the Smartphone Summit on October 22nd, and below you will find just some of our top enterprise focused session topic title including:

- **Smartphone Worldwide Symposium** - An Analyst Overview
- **Smartphone Summit Morning Keynote** Presented By Symbian
- **Enabling Your Business with Smartphone & Wireless** - First Steps and Challenges
- **Best New Smartphone Handsets & Devices for the Enterprise**
- **Mobile Web 2.0** - Integration and Convergence of Mobile Applications
- **Smartphone & Wireless Security:** Steps to Safeguarding Your Business
- **Smartphone Essentials** - Push Email Applications & High Speed Networks
- **Mobile Commerce** - Payment & Marketing Solutions for Smartphone Devices
- **Smartphone Solutions 2010** - Preparing For The Next Decade In Wireless
- **GPS and LBS Location Based Solutions** for Enhancing & Enabling Your Business
- **The Costs of Enterprise Mobility Today** - A Bargain or Burden Analysis.
- **Smartphone Interactivity** (Social Networking & Personal Communications)
- **Best New Usability Solutions:** Voice Recognition, Mobile Search, Interfaces & More!
- **Smartphone & Mobile Entertainment** - Pioneering The Rich Media Experience

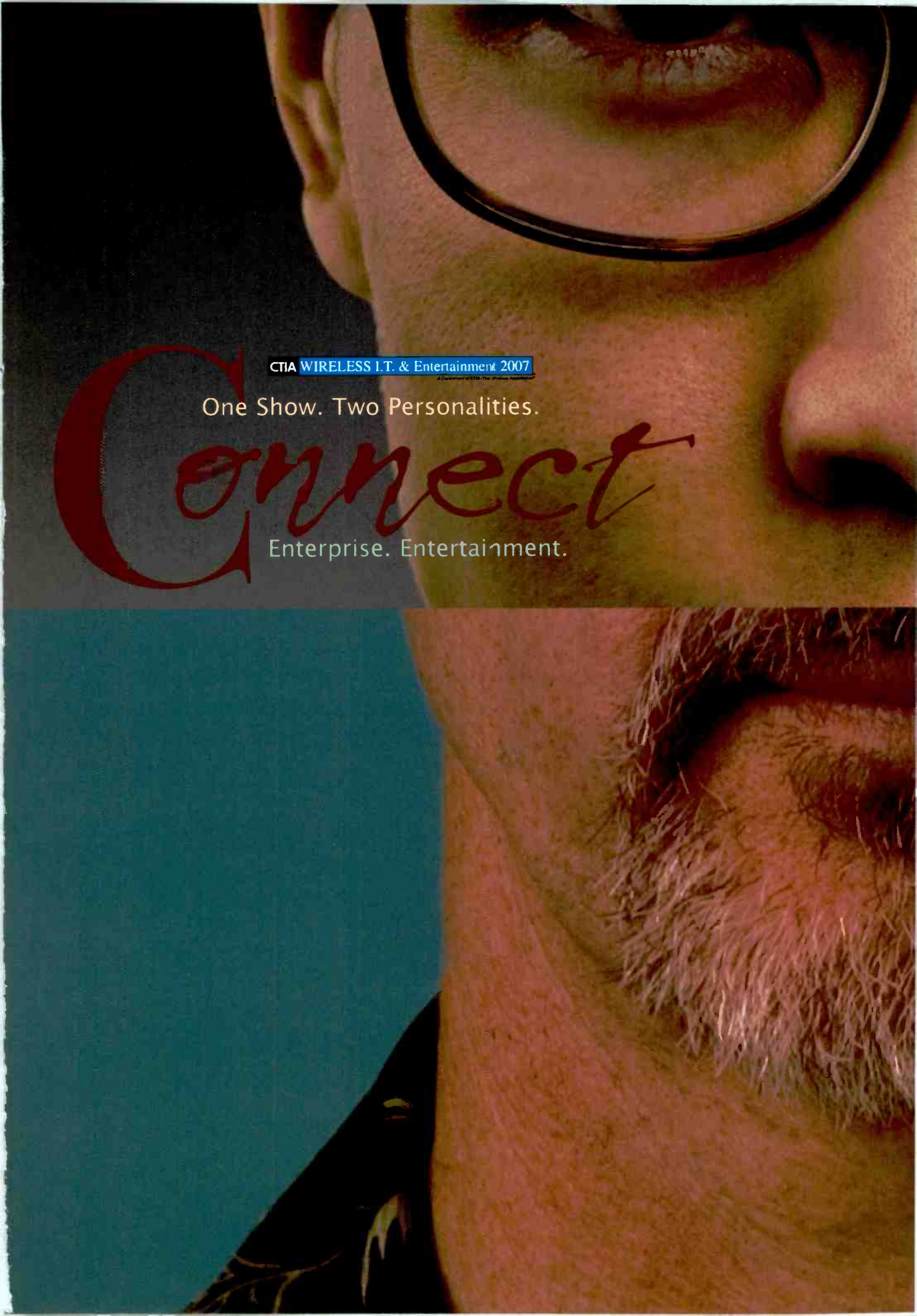
...and more!!

Please visit our website www.SmartPhoneSummit.com for our Schedule.

Don't miss your chance to experience the future of wireless and mobility – Register Now! www.SmartPhoneSummit.com

Registration Fee: $395

PLEASE NOTE: *There is a separate registration fee for Smart Phone Summit 2007 and it is NOT included in the Conference Pass or Smart Pass registration packages. The Smart Phone Summit 2007 fee also includes admission to all keynote sessions and access to the exhibit hall. Please see registration form for details.*


CTIA WIRELESS I.T. & Entertainment 2007
One Show. Two Personalities.
Connect
Enterprise. Entertainment.

CTIA on Your Schedule

New This Year!

CTIA Mobile Video

brought to you in partnership with Vantrix.

Is your handset video capable? You may be surprised! Test your phone on-site at CTIA WIRELESS I.T. & Entertainment 2007.

Register now at www.vantrix.com/ctia.
To learn more about Vantrix, go to www.vantrix.com.

Vantrix

The WIRELESS Chronicles

CTIA WIRELESS I.T. & Entertainment is Ready for its Close-Up, Are You?

Now Announcing:
The WIRELESS Chronicles: A Video Journal Contest.
brought to you in association with Cellfish Media, LLC.

Entering for your chance to become a Convention Celebrity is as easy as lights, camera, interaction! Show off your documentary skills by creating a video journal of CTIA WIRELESS I.T. & Entertainment 2007 experiences and you could win airfare, hotel and a Smart Pass registration to next year's show in San Francisco!

Sign up to receive more information at **www.ctia.org/wirelessIT**.

To learn more about Cellfish, go to www.cellfish.com.

Cellfish

NETWORKING RECEPTIONS

Mobile Entertainment Reception

Wednesday, October 24, 2007
5:30 PM – 7:30 PM
St. Regis Hotel

The Mobile Entertainment Reception at CTIA WIRELESS I.T. & Entertainment 2006 in Los Angeles, CA.

The Mobile Entertainment Reception at CTIA WIRELESS I.T. & Entertainment 2004 in San Francisco, CA.

The Mobile Entertainment Reception continues to be the most sought after ticket in town!

For the past four years, there has been a wait-list to attend this exclusive event that brings together top decision makers and executives from both the content side and the carrier side to network and make deals.

CTIA is pleased to make a limited number of tickets available for purchase. Limit 5 tickets per registrant, with the purchase of a registration package or Special Interest Seminar. Please visit the registration page to purchase your ticket(s) while quantities last.

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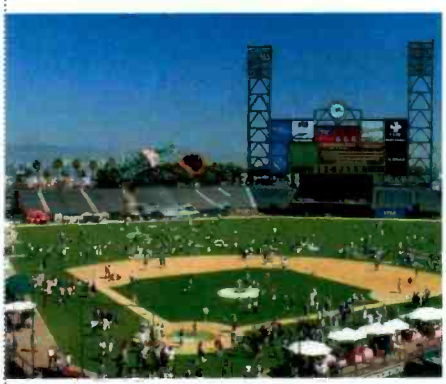
The Mobile Entertainment Reception at CTIA WIRELESS I.T. & Entertainment 2005 in San Francisco, CA.

WIC General Member Reception

Tuesday, October 23, 2007
6:00 PM – 8:00 PM
AT&T Park Field Level

Sponsored by Aeris COMMUNICATIONS

Take Me Out to the Ball Game...



In addition to drinks and appetizers, guests will also have exclusive access to the stadium's batting facilities to practice their swings.

By Invitation Only

HOTELS & INFORMATION

Advantages to Booking with CTIA WIRELESS I.T. & Entertainment Official Housing:

- CTIA WIRELESS I.T. & Entertainment Housing offers highly competitive rates at the official hotels. If you find a lower rate at an official hotel, let us know!
- Hotel descriptions, photos, and San Francisco hotel maps and San Francisco City Guide at your fingertips!
- No pre-payment requirements at time of booking.
- CTIA WIRELESS I.T. & Entertainment Housing e-mail confirmation is immediate!
- Complimentary shuttle service is provided from each official hotel to the Moscone Convention Center.
- Onsite support from the CTIA WIRELESS I.T. & Entertainment Housing Team.

Shuttle Bus Service

For your convenience, shuttle bus service will be available between the South Hall of the Moscone Convention Center and most of the official CTIA WIRELESS I.T. & Entertainment 2007 hotels.

THREE EASY WAYS TO RESERVE HOUSING TODAY!

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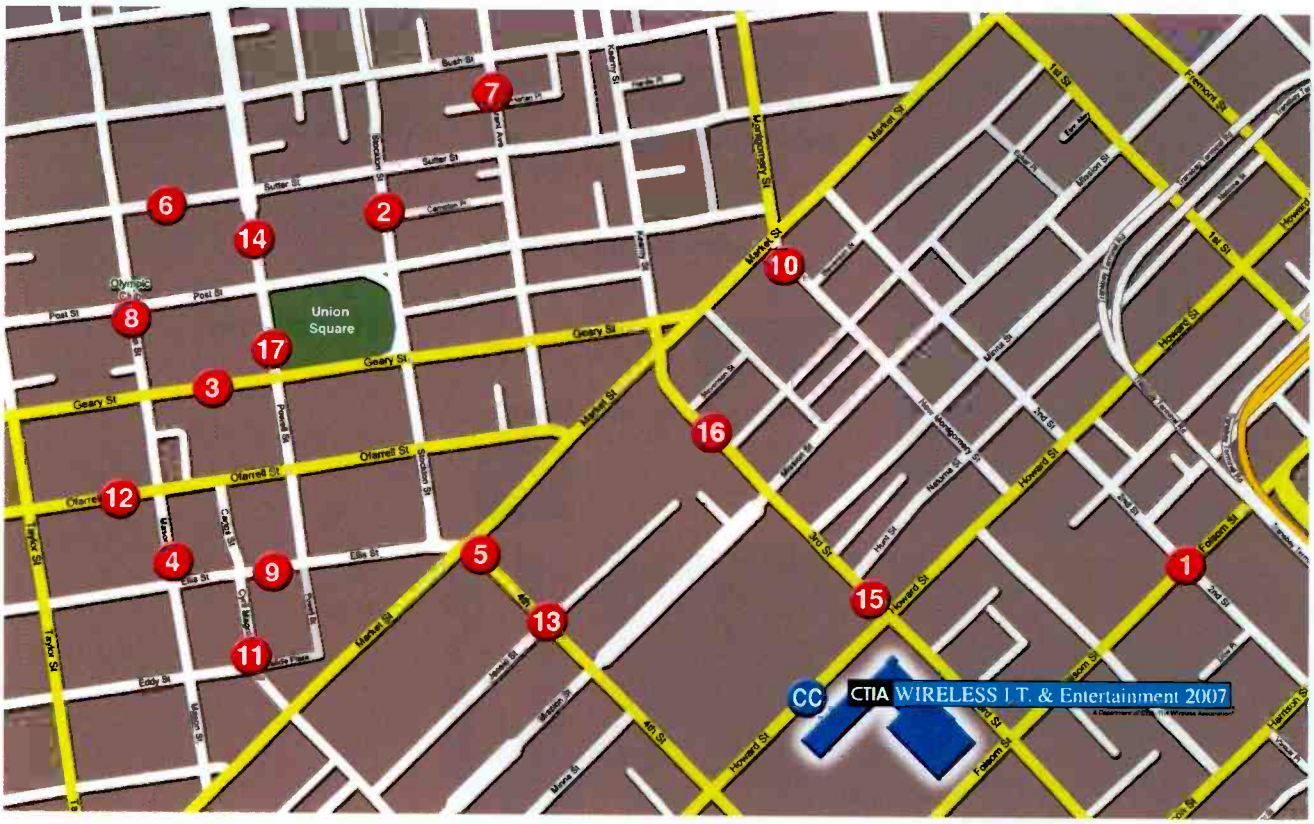

Hotel Name & Address	Map Location	Rates	Distance to Convention Center	Business Center	High Speed Internet Access	Room Service	# of Restaurants and Bars	Fitness Center
~~Courtyard San Francisco~~ SOLD OUT! ~~299 Second Street San Francisco, CA 94105~~	~~1~~	~~$218~~	~~2 Blocks~~	~~Y~~	~~Y~~	~~Y~~	~~2/1~~	~~Y~~
Grand Hyatt San Francisco 345 Stockton Street San Francisco, CA 94108	2	$219	7 Blocks	Y	Y	Y	1/1	Y
Handlery Union Square 351 Geary Street San Francisco, CA 94117	3	$179	5 Blocks	Y	Y	Y	1/1	N
Hotel Nikko San Francisco 222 Mason Street San Francisco, CA 94102	4	$209	5 Blocks	Y	Y	Y	1/1	Y
~~Hotel Palomar~~ SOLD OUT! ~~12 Fourth Street San Francisco, CA 94103~~	~~5~~	~~$226~~	~~2 Blocks~~	~~Y~~	~~Y~~	~~Y~~	~~1/1~~	~~Y~~
Hotel Rex 562 Sutter Street San Francisco, CA 94102	6	$169	10 Blocks	Y	Y	N	1/1	N
Hotel Triton 342 Grant Avenue San Francisco, CA 94108	7	$179	7 Blocks	Y	Y	Y	0/0	Y
JW Marriott San Francisco 500 Post Street San Francisco, CA 94102	8	$279	7 Blocks	Y	Y	Y	1/1	Y
Monticello Inn 127 Ellis Street San Francisco, CA 94102	9	$159	3 Blocks	N	Y	Y	1/1	N
Palace Hotel 2 New Montgomery Street San Francisco, CA 94105	10	$249	4 Blocks	Y	Y	Y	3/1	Y
Parc 55 Hotel 55 Cyril Magnin San Francisco, CA 94102	11	$214	5 Blocks	Y	Y	Y	4/2	Y
San Francisco Hilton 333 O'Farrell Street San Francisco, CA 94102	12	$229	5 Blocks	Y	Y	Y	5/1	Y
~~San Francisco Marriott~~ SOLD OUT! ~~55 Fourth Street San Francisco, CA 94103~~	~~13~~	~~$250~~	~~1 Block~~	~~Y~~	~~Y~~	~~Y~~	~~3/2~~	~~Y~~
Sir Francis Drake 450 Powell Street San Francisco, CA 94102	14	$195	6 Blocks	N	Y	Y	1/1	Y
~~W Hotel San Francisco~~ SOLD OUT! ~~181 Third Street San Francisco, CA 94103~~	~~15~~	~~$285–$750~~	~~1 Block~~	~~Y~~	~~Y~~	~~Y~~	~~2/1~~	~~Y~~
~~Westin San Francisco Market Street~~ SOLD OUT! ~~50 Third Street San Francisco, CA 94103~~	~~16~~	~~$229~~	~~2 Blocks~~	~~Y~~	~~Y~~	~~Y~~	~~1/1~~	~~Y~~
Westin St. Francis 335 Powell Street San Francisco, CA 94102	17	$239–$450	5 Blocks	Y	Y	Y	2/3	Y

REGISTRATION FORM
For Attendees

CTIA WIRELESS I.T. & Entertainment 2007
A Department of CTIA–The Wireless Association®

October 23-25, 2007 Moscone Convention Center San Francisco, CA

>> Complete Housing form to reserve Housing. >> Complete one registration form for each person registering.

1. BADGE INFORMATION *(PLEASE PRINT CLEARLY)*

Full Attendee Name (First, Last)_____ Job Title _____

Company/Organization _____

Business Address _____

City_____ State_____ Postal Code _____ Country_____

Business Phone _____ Ext._____ Business Fax_____ E-mail _____

The personal information provided by you will be held in a database. Initial here to receive show and industry-related information from CTIA and its carefully selected business partners and third parties with whom CTIA shares such information for marketing purposes.

☐ Please check here if under the American Disabilities Act you require auxiliary aids or services to participate. Please email a description of your needs to MSolomon@ctia.org, or fax it to 202.736.3686 by October 1, 2007 and CTIA will contact you prior to the event.

2. CTIA REGISTRATION TYPE

CTIA Smart Pass *BEST VALUE!*

Includes: Admission to all CTIA Educational Sessions, Exhibit Floor, CTIA Keynote Sessions and the Smart Pass Executive Conference (TBD). **Does NOT Include:** Special Interest Seminars (SIS).

☐ Member: $695 ☐ Non-Member: $850

CTIA Conference Pass

Includes: Admission to all CTIA Educational Sessions, Exhibit Floor and CTIA Keynote Sessions. **Does NOT Include:** Special Interest Seminars (SIS), or the Smart Pass Executive Conference (TBD).

☐ Member: $550 ☐ Non-Member: $650

CTIA Daily Rate *Rates shown are per day*

Includes: Admission to CTIA Educational Sessions for Selected Day(s). **BONUS!** Admission to Exhibit Floor and CTIA Keynote Sessions for all three days! **Does NOT Include:** Special Interest Seminars (SIS) or the Smart Pass Executive Conference (TBD).

☐ **Tuesday, 10/23** ☐ **Wednesday, 10/24**
☐ Member: $280 ☐ Non-Member: $330

CTIA Exhibits Package

Includes: Admission to Exhibit Floor and CTIA Keynote Sessions. **Does NOT Include:** CTIA Educational Sessions, Special Interest Seminars (SIS) or the Smart Pass Executive Conference (TBD).

☐ Member: $75 ☐ Non-Member: $85

3. SPECIAL INTEREST SEMINARS (SIS)

Andrew Seybold University—Monday, October 22
☐ $349

Deloitte Wireless Fast 50 Awards—Tuesday, October 23
Open to All Registered Attendees
☐ FREE

Enterprise Mobility—Monday, October 22
☐ $395

Marketing—The Mobile Channel—Monday, October 22
☐ $349

Mobile Entertainment Live!—Monday, October 22
The Mobile Entertainment Content, Commerce & Applications Conference
☐ $499

NAVTEQ Connections 2007—Monday, October 22
Open to All Registered Attendees; Subject to Space Availability
☐ FREE

Smart Phone Summit—Monday, October 22
☐ $395

SIS SPECIAL BONUS: *FREE Admission to Exhibit Floor and Keynotes!* **DOES NOT INCLUDE:** *CTIA Educational Sessions or Smart Pass Conference.*

5. DEMOGRAPHIC PROFILE

(Complete this section to receive your Attendee Electronic Business Card)

What is your company's principal business? [check only one]
A. ☐ Applications/Software Developer
B. ☐ ASP – Application Service Provider
C. ☐ Consultant
D. ☐ Content Provider/Aggregator
E. ☐ Enterprise/Corporate/SOHO End-User
F. ☐ Dealer/Retailer
G. ☐ Distributor/Reseller/VAR
H. ☐ Engineering
I. ☐ Field Sales & Service
J. ☐ Financial Services/Investment Banking/ Venture Capital
K. ☐ Fixed Wireless
L. ☐ Gaming/Music/Video
M. ☐ Healthcare
N. ☐ ISP – Internet Service Provider
O. ☐ Manufacturer
P. ☐ OEM
Q. ☐ Systems Integrator
R. ☐ Transportation
S. ☐ Utilities Provider
T. ☐ Vertical Market
U. ☐ WiFi/802.11/802.16
V. ☐ Wireless Portal
W. ☐ Wireless Service Provider [Narrow/Broadband PCS, Cellular, CDPD, ESMR]
X. ☐ Other:_____

What is your title classification? [check only one]
A. ☐ Executive (CEO, CTO, CIO, COO, Chairman, President, VP, etc.)
B. ☐ Management (Director, Manager, etc.)
C. ☐ Assistant/Coordinator
D. ☐ Other_____

What is your job function?
A. ☐ Consultant
B. ☐ Corporate Management
C. ☐ Engineering/Technical Operations
D. ☐ Entertainment/Producer
E. ☐ Investor/Analyst/Venture Capitalist/Research
F. ☐ Legal
G. ☐ MIS/IT
H. ☐ Sales/Marketing/Business Development
I. ☐ Programmer/Developer/Software Publisher
J. ☐ Other_____

What is your purchasing involvement? [check only one]
A. ☐ Directly responsible
B. ☐ Make recommendations
C. ☐ No involvement

What products or services are you interested in? [check up to 5]
A. ☐ 2.5G/3G
B. ☐ Accessories
C. ☐ Antennas
D. ☐ Batteries
E. ☐ Billing/Accounting Systems
F. ☐ Bluetooth/PAN
G. ☐ Brokerage/Financial Services
H. ☐ CDPD Applications
I. ☐ Data Integration Services
J. ☐ Engineering Services
K. ☐ Enhanced Services
L. ☐ Fixed Wireless/Broadband
M. ☐ Handsets
N. ☐ Location-Based Services/GPS
O. ☐ Mcommerce
P. ☐ Mobile Entertainment
Q. ☐ Networking Equipment
R. ☐ Networking Software
S. ☐ RFID/Sensors/MtoM
T. ☐ Security
U. ☐ Test Equipment
V. ☐ Voice Recognition
W. ☐ VoIP
X. ☐ WiFi/802.11/802.16/WLAN
Y. ☐ Wireless Email/Internet
Z. ☐ Wireless Handhelds/PDAs/Smartphones
AA. ☐ Wireless Content
BB. ☐ Wireless Imaging
CC. ☐ Wireless Middleware
DD. ☐ Wireless Data, Other: _____
EE. ☐ Wireless Services

4. PAYMENT INFORMATION/FORM OF PAYMENT

Full payment must accompany this form to be processed. If paying registration by check, please make payable to **CTIA WIRELESS I.T. & Entertainment 2007**. If paying by credit card, please complete the following information:

☐ Corporate Check
☐ MasterCard
☐ VISA
☐ American Express
☐ Discover

$_____ Convention Registration
$_____ Special Interest Seminars (SIS)
$_____ **Total Amount Due**

Card Number _____ Exp. Date _____ CVW (as it appears on front or back of credit card)

Signature (charge authorization) _____

Name and Organization as it appears on card _____

I authorize **CTIA WIRELESS I.T. & Entertainment 2007** Registration to charge my account for registration fees for **CTIA WIRELESS I.T. & Entertainment 2007**. Submission of this registration form confirms that I have read, I understand, I agree and will comply with the published Registration Cancellation Policy below.

REGISTER TODAY! ONLINE: www.ctia.org/wirelessIT FAX: 801-406-0660 MAIL: 2822 South Redwood Road, Salt Lake City, UT 84119

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POLICIES: Cancellations, substitutions and requests for refund will not be accepted by telephone and must be submitted in writing for consideration. Cancellations and refunds will be considered only submitted in writing no later than the following deadlines: Cancellations received by 9/10/07 – **Full refund, less $50 fee;** Cancellations received after 9/10/07 and on or before 9/24/07 – **50% refu** Cancellations received after 9/10/07 – **No refund. There will be a $25 charge for badge substitutions.** Cancellations must be submitted in writing to: **CTIA WIRELESS I.T. & Entertainment 2007 Registrat** 1400 16th Street, NW, Suite 600, Washington, DC 20036, or faxed to 202-736-3686. **Badge** mailing deadline: *For Trade Only. No one under 18 years of age will be admitted onto the trade show floor.*

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Help Wanted

CHIEF ENGINEER

Position requires extensive experience in maintaining and troubleshooting a wide variety of broadcast equipment. Thales Digital and Analog transmitters, microwave and studio equipment, Wolfcoach satellite truck, video servers and IT infrastructure. Must exhibit an advanced knowledge of electronics, digital technology, networking, computer and network security, station automation, acquisition and transmission of TV broadcast assets along with broadcast-oriented digital content storage, creation systems and RF systems as well as studio and remote production. This position is part of the senior management team. Must be on call 7 days/week, 24 hours/day. Must have at least 10 years experience in the maintenance and operation of broadcast RF equipment. Trade school, military training or college degree preferred. Driver's license required, SBE certification or equivalent credentials desired. Send resume to info@ksbitv.com or 405 631-7367

Help Wanted

PANASONIC BROADCAST & TELEVISION SYSTEMS COMPANY PRODUCT ENGINEER LOS ANGELES, CA

Provide Product Engineering Support for all Panasonic Broadcast & Television Systems Recording, Storage, & Distribution Products. Act as the primary recording, storage, and distribution system product engineering expert for PBTS providing support to the sales, marketing, and business development staff and end-users. Products will include high-end production equipment and content storage & delivery systems incorporating tape, optical disc, solid state, and HDD technology. Must have a strong foundation in the production, post production and broadcast industry with an intimate working knowledge of existing and emerging workflows. 5-7 years of both IT networking and VTR engineering/operational experience desired. Must have a complete understanding of the design, operation and application of the assigned products. Ability to troubleshoot and repair broadcast products and systems and use of all test equipment and tooling required to support the product. Identify product quality, repair trends and potential problems, develop an action plan and submit to the appropriate personnel in the US and the factory for resolution. Approximately 30% travel required within the US. Candidates interested in this or any position with Panasonic should register and login at the Panasonic Career Center website below: www.panasonic.com/careers
Job ID #: 14536

TELEVISION TRANSMITTER MAINTENANCE

WGAL is seeking an applicant for Television Transmitter Maintenance. This position requires that the applicant be skilled in hands-on electronic maintenance of high-powered television transmitters. A working knowledge of television equipment and associated systems is required. A General Class FCC License or SBE Certification is desirable. This person will also have an opportunity to be involved in studio maintenance and the installation of television equipment. Send resume to Robert Good, P.O. Box 7127, Lancaster, PA 17604 or email rgood@hearst.com. EOE.

MAINTENANCE ENGINEER

WUSA-TV, Washington, DC is seeking a Maintenance Engineer. The duties include but not limited to providing routine, preventative and emergency maintenance to broadcasting equipment, providing engineering assistance to the various departments within the Company and members of the viewing public. The successful candidate will have strong experience in Maintenance Engineering. Ideal Candidates should have 5+ years experience in broadcast television maintenance, experience in HD & SD, tape and server based digital video systems; routers, analog and digital RF. This candidate should be comfortable working in an IT dominant environment. Degree in Electronics Engineering or SBE certification preferred. Send cover letter and resume to: **rgorbutt@wusa9.com**

Help Wanted

CHIEF ENGINEER

WJET-ABC/WFXP-FOX in Erie, PA. is seeking a Chief Engineer. This Department Head position oversees all studio operations, technical maintenance, and information systems. Responsibilities include hiring, training and evaluating dept. personnel and develops operating and capital budgets. Microwave, transmitter, building and information systems maintenance essential. Resume' to Tim Dunst, VP/GM WJET, tdunst@wjettv.com. WJET provides services to WFXP through a time brokerage agreement. Nexstar Broadcasting is an equal opportunity employer.

BROADCAST MAINTENANCE ENGINEER

WLNS-TV/DT has an immediate opening for a Broadcast Maintenance Engineer with 3-5 years experience. Successful candidate must possess a working knowledge of digital formats, both standard and high definition. Duties include equipment installation, work on Harris transmitters, support of ENPS newsroom system, server based news editing systems, broadcast automation, production and MCR switchers, audio consoles, microwave equipment, satellite receivers, routers, SX/SP/DVC Pro format tape machines, ENG trucks, non-linear editors, and all associated broadcast gear. SBE certification desirable. Individual must be capable of lifting 50 pounds and mobility is required. Send resumes to **jwing@wlns.com** . **www.wlns.com**

CHIEF ENGINEER

WUPW the FOX affiliate in Toledo, OH is seeking a hands-on Chief Engineer. Responsibilities include management of station's technical infrastructure, maintenance, transmitter, master control & IT services. This person is the key member of technical & operational group supporting all areas of technical operation of the station including a strong news dept. Good people skills a must. Extensive experience in local TV is critical. Successful candidate is a trouble-shooter with in depth knowledge of digital, analog, IT & microwave technology. Knowledge of automation systems, servers, newsroom systems, FCC rules, & transmitters required. Key position in the station's management team works with other Dept Heads in strategic planning, budgeting & implementation. 5 years technical experience in a local station required. SBE cert. & college degree preferred. Send resume to Human Resources, FOX Toledo, 4 Seagate, Toledo, OH 43604 EOE

ENGINEERING MAINTENANCE TECHNICIAN

WJZ-TV, Baltimore, MD, a CBS Television Station, is seeking an Engineering Maintenance Technician. Applicants should have a minimum of 5 years experience maintaining television broadcast equipment. Experience troubleshooting & repairing Panasonic DVC cameras and tape decks is desired. Experience with video servers, Digital and HDTV equipment is a plus. Knowledge of PCs expected. EOE Contact: Pete Mentch, WJZ-TV, 3725 Malden Ave. Baltimore, MD 21211 Email: **mentchp@wjz.com**, Tel. (410) 578-7569

Help Wanted

NETWORK TECHNICAL MAINTENANCE (MAINTENANCE ENGINEER)

Job Responsibilities:
Strong technical background in HD and SD digital video and audio systems, with minimum 5 years technical maintenance experience within a television or cable facility and skilled in the maintenance of digital and analog broadcast equipment including on-air Nexio and Grass Valley video servers, HD switchers (including Snell and Sony 8000), SD switchers, cameras (both HD and SD), digital routing switchers, graphic systems, and analog and digital tape formats. Should have excellent troubleshooting skills. Must also have experience in the maintenance of a satellite uplink and downlink facility. Must be familiar with the maintenance of high power microwave transmitters, and antenna systems and combiners. Must be comfortable working in an IT intensive environment. Familiarity with Computer and Networking technologies and how they interface in the broadcast environment. This position will require shift work.
Desired Qualifications:
• Bachelor of Science in Electrical Engineering or Electronics Technology
• SBE Broadcast Certification
Location: New York, NY Req ID: 109756
Apply Online At: **https://disney.recruitmax.com//main/careerportal/Job_Profile.cfm?szOrderID=109756**

WESTERN KENTUCKY UNIVERSITY CATV ENGINEER

Western Kentucky University, Department of Educational Telecommunications is seeking applicants for a CATV Engineer. The CATV Engineer is responsible for the design, construction, supervision and maintenance of the University's two CATV Systems. In addition, position may also assist the Television Engineering Department as necessary. The position reports to the TV Chief Engineer.

Responsibilities:
• Develops and designs the expansion and rehabilitation of the University's CATV Systems as the campus grows and is re-built.
• Maintains, Monitors and supervises the CATV distribution systems.
• Detects faulty CATV system equipment, then determines a solution for repair within the timeframe and budget constraints of the operation.
• Advises the Director of Educational Telecommunications on future technologies and trends in the CATV industry and makes recommendations for implementation of new technologies for the University's CATV systems.
• Assists the Television Engineering department when available.
• Other responsibilities as deemed necessary.

For more information and to apply, refer to the following website: **http://acsweb1.wku.edu/wkujobs**. Please reference requisition number **S1532**. For further assistance call (270) 745-5934. Applications must be received by Nov. 7, 2007.

Help Wanted

Help Wanted

Help Wanted

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As a primary tech at our Video Master Control facility, you'll monitor network status/activity, help clients with events, and maintain/repair A/V equipment. Requires either an AA degree in a relevant technical discipline plus 2 years' experience in the operation/repair of A/V and broadcast electronic equipment, or 4 years' directly related experience.

VIDEO NETWORK SPECIALIST

You'll provide local technical support of all media support services systems, including media on demand, videoconferencing network/facilities, video production/editing, and digital signage. Requires a bachelor's degree in EE or related field, plus 4-6 years' experience in video network and systems design. FCC General Class licensure and/or SBE certification preferred.

Mayo Clinic offers outstanding benefits, competitive compensation and a generous relocation package. To build an online application, please visit the Mayo Clinic website at www.mayoclinic.org/jobs-sct.

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CHIEF ENGINEER

NPG of Oregon Inc., a cluster of television stations that includes the NBC, FOX, The CW, and Telemundo affiliates in Bend, Oregon, is accepting applications for Chief Engineer. Chief Engineer is responsible for overall technical operation of property including RF engineering, video systems design and integration. This position supervises the engineering and operations departments and manages physical plant, technical plant and information technology systems of the company. **Qualifications:** Four-year Engineering degree preferred with minimum 2 years formal electronics training; five years television engineering experience w/supervisory management; or combination of education and experience. Applicant should possess average mobility and good general dexterity. Valid Oregon driver's license or ability to obtain one is required. Send cover with resume to: Attn: Human Resources, KTVZ-TV, PO Box 6038, Bend Oregon, 97708-6038 Or e-mail resume to **danettes@ktvz.com**. References must be made available upon request. Candidate must pass a drug test and background check. **KTVZ is an equal opportunity employer.**

UPLINK ENGINEER
Woodlands, Texas

Develops, implements, repairs, and maintains RF transmission, reception, and compression systems. Provides training and support on specialized equipment/systems, performing transmit maintenance, and performance checks. Performs preventive maintenance on compression systems, RF transmitters, uplink antennas and associated components. Installs hardware, system upgrades and modifications. If interested please contact Gene White at 713-821-7686 or **gene.white@foxsports.net.**

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TECHNICAL MANAGER

This bi-coastal organization has an opening for a Technical Manager in their Los Angeles location. A production facility that was founded over 30 years ago that hosts numerous live interviews, panel discussions and events with the worlds most recognizable talent. The organization uses cutting edge technology to produce digital content that is viewed and downloaded on the web. If you would like to be part of this cutting edge institution and have the following skills, apply by emailing your resume, cover letter **including salary requirements** to **latechmgr@gmail.com**

The ideal candidate for this position should be a problem solver who will be responsible for existing system support, new system installation and specification, production technical management and operation. Must have a good understanding of system design and be able to create and follow flow drawings. This candidate must have an in-depth knowledge of broadcast systems.

This position is the senior technical member in our LA facility. The candidate should also have a solid technical background with the following IT based broadcast technology: Video Servers, Shared storage systems including: NAS, SAN and XSAN, NFS and SMB in MAC, PC and Linux environment, VLAN and networking. Encoding and Transcoding to the following formats: Windows Media, MPEG – 2 & 4 and Flash.

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The elephant in the room

The future of TV ad spending could belong to cable.

BY ANTHONY R. GARANO

"Broadcast television to be replaced by the Internet" and "Advertising moving to the Internet" are a couple of the screaming headlines today. But, what's really happening? More importantly, what's the real effect?

Certainly, the number of eyeballs in front of a TV set versus those in front of a computer monitor sets the stage for a huge competition. Like it or not, in virtually every survey taken, the results consistently show the computer winning.

All that notwithstanding, in the Organization for Economic Cooperation and Development's recently published "Communications Outlook 2007," the group ranked U.S. TV viewing households number one in the world at eight-plus hours a day in front of the tube.

According to a recent study by IBM, nearly 45 percent of respondents said they spent more than four hours per day on the Internet. Ah, wait a minute, you ask. Where are all those hours coming from?

Unlike television, the Internet is widely available in the workplace and, lamentably to employers, some of that work time is spent as personal time on the Internet — but, that's a topic for an entirely different article. Back to why capturing those eyeballs is so important to us. Right! Ad dollars. Some people believe that broadcast television is in a life or death struggle with the Internet for advertising dollars and that television will inevitably lose.

By definition, the Internet fractionalizes its audience. However, a compelling quality of the Internet is interactivity, which creates advertising leverage by delivering targeted ads.

Television, on the other hand, remains unsurpassed in advertising effectiveness when the target of the advertiser is to deliver a message to a single, massive audience in a timely and measurable fashion. Television excels by guaranteeing delivery of an advertiser's message simultaneously into millions of homes. Not only do advertisers recognize this, but viewers share the same opinion.

For example, in that same IBM study, a question to respondents on advertising effectiveness revealed broadcast television comfortably in the lead at just over 50 percent, followed by cable at close to 20 percent and the Internet at 10 percent. Clearly then, all signs point to a continuing ability for television to drink heartily at the well of advertising spending for a long time to come.

In this article, as in most, the term "television" is an encompassing generic. For purposes of real analysis, however, it needs to be more meaningfully defined with a descriptor, such as broadcast television, cable television or satellite television. In the game of eyeballs, satellite television is a distant third in terms of advertising effectiveness. Cable television is another matter. Content for cable, whether dramatic or comedic, has the advantage of being able to take an edgier path with program development, while broadcast television is mandated by censorship requirements.

As a result, cable has been delivering some blockbuster series, and blockbuster series mean viewership. But cable is enjoying success even beyond the edgy program material.

As a broadcaster, the next time you see one of those "Internet taking over television advertising" headlines, you had better think twice about who the elephant in the room really is.

A recent weekly Nielsen ratings for broadcast ranked NBC's "America's Got Talent" at number one with 10.8 million viewers and CBS' "60 Minutes" number two with 9.9 million viewers. For that same week, cable's Disney Channel ranked both one and two with "High School Musical 2" (single-day ratings) at 17.2 million viewers and "Hannah Montana" (single-day ratings) at 10.7 million viewers. Those are significant viewership numbers for cable and such a plus differential over broadcast that advertisers must be sitting up and taking notice.

As a broadcaster, the next time you see one of those "Internet taking over television advertising" headlines, you can be comforted by your distinctive capability to deliver programming to a massive audience, but you had better think twice about who the elephant in the room really is. BE

Anthony R. Garagno is a consultant and former industry executive.

? Send questions and comments to: anthony.gargano@penton.com

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