NOVEMBER 2011

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Solve reception problems with these five key tests

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ON THE COVER:
After receiving a call from a viewer having difficulty with reception, a broadcaster is often left wondering about the quality of the signal in a certain area. Here are five tests that can help resolve reception problems.

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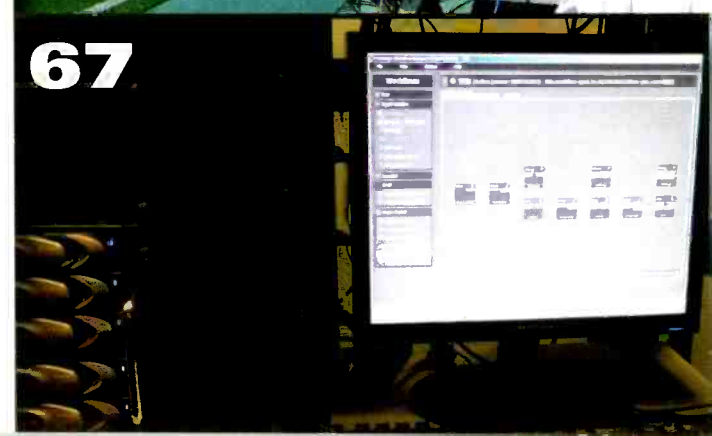
JUST THE FACTS!

Consumers subscribing to television service via cable, satellite or telco services are downgrading their services at an accelerating pace, according to a new study from Parks Associates of Dallas. The study found that 13 percent of viewers who have broadband connections have made cutbacks within the last 12 month, and another 9 percent is about to cut the cord. Parks' study said this includes about 3.9 million people who regularly watch Internet video.

Learn more at *www.broadcastengineering.com*



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Damn nuts

We've all been tripped up by something to which we should have seen or paid attention. Perhaps you locked your keys inside the car because your mind was somewhere else. Or, maybe you tripped over a child's toy because it wasn't picked it up before bedtime. I once walked out of a restaurant without paying the tab because my mind was on someone I'd just met.

We laugh when an actor slips and falls or bumps into something. Some comedians even become famous for their physical gags of falling and clowning around. It's for that reason that Dick Van Dyke is one of my favorite actors. He has the unique gift of physical humor. His tripping, falling and then catching himself always brings a smile to my face.

However, when one experiences firsthand a trip and fall that seemed comical on TV, the result is seldom as funny.

Being a serious runner for about 35 years, at up to 2000 miles per year, my body is telling me to cut back. So, as a partial replacement, I occasionally ride a bicycle instead. Biking is strictly my second choice, but how hard can it be?

As I learned in mid-October, the biking part isn't hard. It is the sudden stop that can hurt.

I was racing along the local trails when a personal encounter with a couple of small objects caused me to better understand an important difference between running and biking. The human body is moving much faster when on a bike.

Near the end of a 30-miler, my front tire rode over a pile of raw walnuts, causing me to flip over the bike and meet the trail chest first. I realize it's possible to use Newton's second law of motion to predict the force that was applied to a moving object (me) when (not if) I fell off my bike: F = M * A. However, college physics wasn't exactly on my mind at the time.

So, sitting here now in some amount of pain, I draw a perhaps loose parallel with my fall and the broadcast spectrum. For more than 80 years of pretty much repeatedly doing the same thing, quite well I might add, broadcasters now find themselves in a race for viewers against new competition. Broadcasters are discovering they need to move much faster, do more things and add new services — all in an effort to remain profitable and hold on to their audiences. In other words, stations now have to work harder and ride faster.

Unfortunately, there may be a few nuts along that path that could trip up even the best broadcast manager. Those nuts include competition, politicians and bureaucrats.

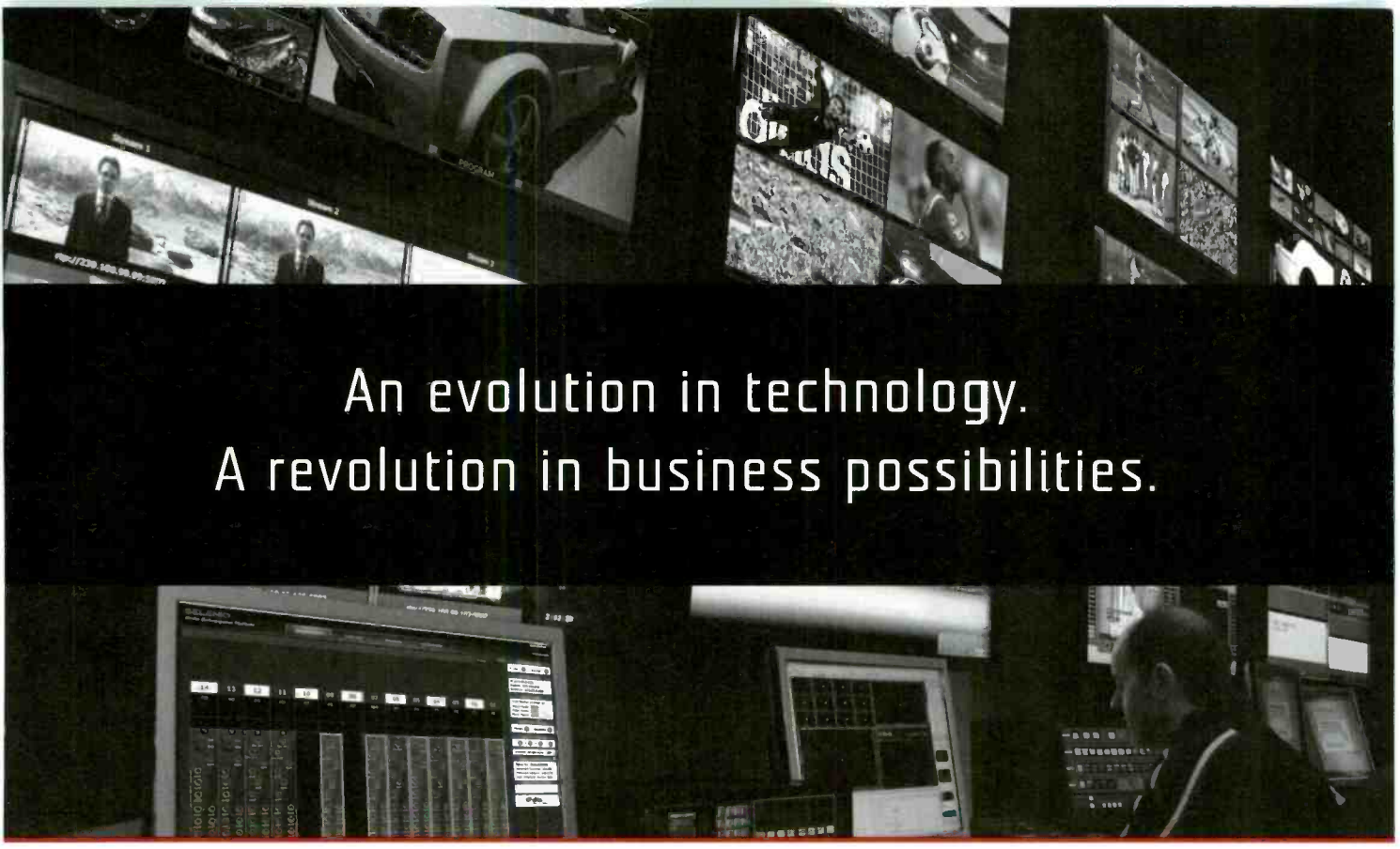
The mobile industry cries for more spectrum, saying there is a crisis. Politicians say government needs more money. It's a crisis. Worst of all, the bureaucrats say, "Don't worry. We have the solution to both crises. Shrink the TV band, and sell the spectrum."

That solution would force TV stations to go out of business, combine operations and change channels so the spectrum can be auctioned for tens of billions of dollars. The entire scenario might be funny if the results were not so painful for broadcasters — and American viewers.

A recent report claims that without a multiscreen broadcast strategy, TV stations are missing out on 78 percent of the potential audience. These viewers comprise one billion computers and four billion mobile users.

Unfortunately, broadcasters will never be able reach these audiences if the 'nuts' in Washington have their way. BE

Brad Dick
EDITORIAL DIRECTOR
Send comments to: editor@broadcastengineering.com



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IP newsgathering

Local broadcasters leverage cell and satellite networks to reap newsgathering benefits.

BY PHIL KURZ

Five years ago, CNN opened a new chapter in the use of newsgathering technology when it delivered live and recorded reports of the Israel-Hezbollah conflict using IP technology and networks.

The news network deployed journalists with a combination of portable cameras, laptop editors, IP contribution technology and advanced satellite uplinks. The setup gave CNN a new level of mobility, speed and flexibility to contribute coverage of the conflict. For these efforts, CNN was first recognized with a pair of Innovation Awards at IBC2007 in Amsterdam and in January 2008 with a Technology & Engineering Emmy Award.

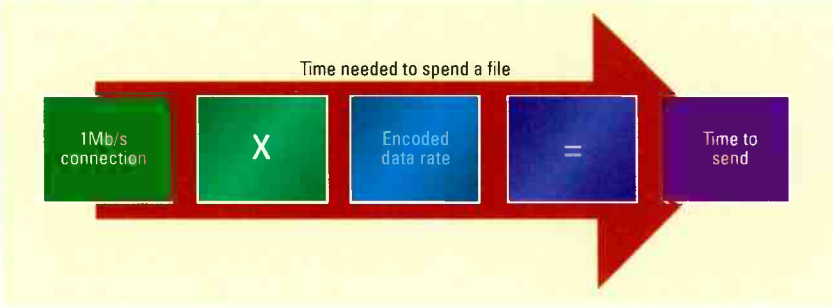


Figure 1. This simple equation determines how long it will take to transfer a file based on the connection speed and the encoded bit rate. Figure courtesy Bitcentral.

Fast forward to today, and similar IP newsgathering systems are deployed around the world by television news organizations to cover everything from the aftermath of hurricanes and tsunamis to military conflicts and the election trail.

But, IP newsgathering systems aren't limited to use by networks keen on getting to some remote corner of the planet. Local broadcasters and station groups also are deploying IP newsgathering systems to lower costs, reduce response times to breaking news and increase the number of reporters in the field.

Putting more feet on the street is exactly what local news needs, says Dave Smith, CEO and co-founder of Los Angeles-based SmithGeiger consultancy.

"Local news has become pretty generic," Smith said. "You have to have a lot of original reporting.

"Stations have to get new, original stories on-air; they have to get back to beat stories. With MMJs (multimedia journalists), they can work beats and don't have to have eight people on standby to race out to shoot in front of a breaking story."

IP newsgathering technology gives them a way to contribute those beat stories without the expense of traditional electronic news gathering.

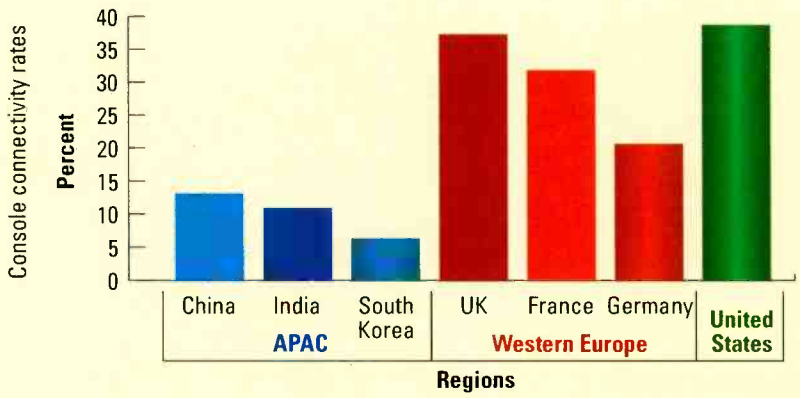
The timing formula

Unlike licensed Broadcast Auxiliary Service (BAS) point-to-point ENG microwave contribution and traditional satellite newsgathering, IP newsgathering leverages the extensive, wireless, portable IP satellite transmission and wired Internet infrastructure to transport live and store-and-forward reports. While doing so offers a number of advantages, including lower cost, quicker response and greater

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

More than gaming

For online video viewing, game consoles are the most popular gateway in the U.S., which also had the highest connectivity rate among seven nations.



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mobility over traditional contribution approaches, IP news transport faces one challenge that ENG and SNG do not — namely bit rate, or data transfer rate. In news, where every second counts, having sufficient bit rate literally can make or break the timeliness and relevancy of a report.

At an IT technology summit hosted by *Broadcast Engineering* in 2010, Fred Fourcher, CEO of Bitcentral, laid out a simple formula that puts bit rate into perspective as it impacts newsgathering. The formula (1Mb/s Connection x Encoded Data Rate = Time to Send) elegantly sums up the challenge facing any reporter relying on an IP network for story contribution. (See Figure 1 on page 12.)

To put that challenge into perspective, consider that the encoded data rate of MPEG-4 H.264 compressed 720p HD video is 11Mb/s. (See Table 1.) Obviously, with a 1Mb/s connection, it will take 11 seconds to contribute one second of report. A two-minute report, therefore, would require 22 minutes to submit via a 1Mb/s connection (120 seconds of an encoded news report x 11 seconds). The delay grows dramatically from there as resolution increases to 1080i source footage.

A couple of solutions are obvious: Increase the data rate of the connection and employ more efficient encoders or compression algorithms. A variety of vendors offering IP newsgathering systems have addressed the former by increasing the number of IP paths, including support for multiple wireless Internet modems from different service providers, and channel bonding the connections. One, in particular, takes a slightly different approach and examines the network performance of each available wireless path. In essence, it performs a reverse stat mux to divvy up the data in a way to take advantage of the maximum data transfer rate of each wireless connection employed.

Until very recently, these types of strategies were about the only ones available to increase transfer rate. That's because even as companies like Verizon Wireless, Sprint and AT&T roll out their 4G wireless networks, high-data transfer rates were reserved for downloads, not uploads. But, that began to change in the spring when one vendor announced at the 2011 NAB Show that it would begin shipping later in the year a self-contained, on-camera IP newsgathering solution with full integration with the Verizon Wireless 4G LTE network that takes advantage of possible upload speeds that can provide reliable delivery of broadcast video in real-time for live news.

Another solution is to take advantage of other faster wireless technologies, such as WiMAX, or tap data transfer rates available on a wired Internet connection. As for the other part of the equation — finding more efficient encoders and algorithms — price has limited deployment of more efficient encoders for IP newsgathering, and work is still under way on the successor to H.264 compression.

New possibilities and priorities

Despite the bit-rate challenge, local broadcasters are increasingly embracing IP newsgathering as a supplement to traditional ENG and SNG backhaul for contribution of stories because of portability and speed.

The apprehension of the alleged bank-robbing Dougherty gang this summer in southern Colorado is a good example, said Jim Ocon, VP-Technology for the Gray Television broadcast group. The gang — Lee-Grace Dougherty; her brother, Ryan Dougherty; and her half-brother, Dylan Dougherty Stanley — were taken into custody after a 20mi, high-speed car chase.

"Our station in Colorado Springs rolled their satellite truck and couldn't get a signal but had their (IP newsgathering) backpack and used it to scoop the country," Ocon said. "They deploy so much faster than a truck. Once the yellow tape goes up, and people are on the scene, you go with a traditional truck or a land line if you have one (for the Internet connection)."

Gray Television, which serves 30 markets across the country, has outfitted about half of its newsrooms with backpack-based IP newsgathering systems and has plans to equip the rest.

"We are finding that acceptance from stations is really spectacular," Ocon said.

Resolution (W x H)	Pixels	Description	Multiple of SD	MPEG-2 compress Mb/s	MPEG-4 compress Mb/s
720 x 480	345,600	Standard definition	1	8	4
1280 x 720	921,600	720p	3	21	11
1280 x 1080	1,382,400	Used by Panasonic	4	32	16
1440 x 1080	1,555,200	Used by Sony	5	36	18
1920 x 1080	2,073,600	1080i	6	48	24

Table 1. A comparison of the size of HD and SD formats as it relates to resolution and bit rate. The MPEG-4 column refers to H.264 compression and is considered to have similar quality at about half the data rate of MPEG-2. The chart shows the data rates starting with MPEG-2 at 8Mb/s. Table courtesy Bitcentral.

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What IP newsgathering offers newsrooms is a new tier of coverage, said Del Parks, VP Operations and Engineering of the Sinclair Broadcast Group (SBG).

"They're the next level down from a live truck," Parks said. "If it is a scoot and shoot, then you might use one of these backpacks."

With stations in 39 markets, SBG is currently finalizing a deal to equip all of its stations that do local news with an IP newsgathering backpack, according to Parks. From a strategic point of view, IP newsgathering opens up new possibilities for capital expense devoted to field contribution.

"Maybe now, we don't need five live trucks; maybe we need three," Parks said. "As you introduce technology, you reduce the cost on the big ticket items and spread it over these lower-cost technologies, and it gives you more capability.

"At the end of the day, it is about getting more content."

Ocon, however, sees IP newsgathering as a way to break cleanly with the past.

"I am not buying any more live trucks," he said. "We'll still have a vehicle to get to the story, but that is different from a masted vehicle that costs $100,000 or more.

"Those (ENG trucks) are a huge safety risk. They cost a lot in maintenance and gas, and there is an environmental cost as well."

While Ocon said there are no plans to eliminate the station group's ENG fleet, Gray Television won't buy any more.

"Gray would much rather invest capital into smaller cameras, iPads, cellular connectivity and mobile editing platforms," Ocon said.

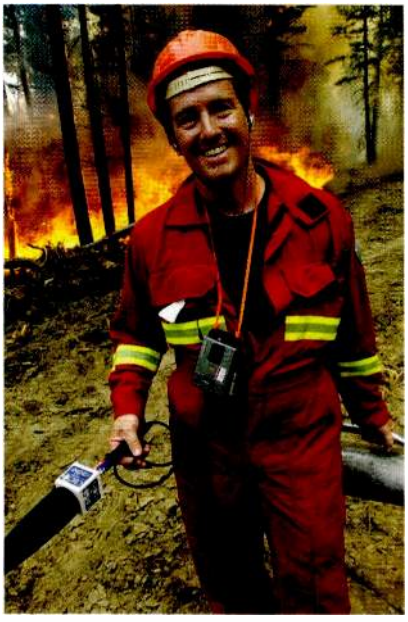
Smartphone newsgathering

Covering a raging forest fire in 2004 from a mountain near Lillooet, British Columbia, Canada, Gary Symons, then a reporter for the Canadian Broadcasting Corp. (CBC), experienced firsthand another limitation of ultraportable backpack journalism.

"I was on a very steep mountain getting coverage," Symons said. "The trees would burn down, and roll downhill spreading the fire."

Carrying three bags of gear, including a video camera, tripod, laptop and audio equipment for both TV and radio coverage, Symons decided to evacuate his reporting position when word came that a big wind had begun spreading the fire even faster.

"I started hiking back up to the truck and caught a wire dangling from one of the bundles on a tree," Symons said. "That flung me down the hill sending my camera, tripod and other gear all over the place. I started picking it up and stepped in a hot spot that caught my pants on fire, which caused me to drop all of the gear again.



Gary Symons, a radio and TV correspondent for the Canadian Broadcasting Corp. in 2004 and today CEO and president of Vericorder, decided to find fire pants and some more portable newsgathering technology after dumping his equipment on the side of mountain and catching his pants on fire while covering a forest fire in British Columbia, Canada.

"That is when I figured I would do two things: Get some fireproof pants and find some more portable gear."

Since that time, Symons started Vericorder, a company that, at the 2011 NAB Show, began offering apps and hardware that turn an Apple iPhone into a Swiss Army knife of ultraportable newsgathering and transport. Using his company's newsgathering software and hardware bundle lets Symons produce three to four finished stories in the time it used to take him to shoot, report, edit and submit one with his backpack of gear, he says. Currently, live video is not an option for the system, but may be in the future, according to Symons, as Vericorder pursues a streaming partner from the broadcast industry.

Other alternatives for live streaming news reports from smartphones exist today, however. This month, AT&T announced AT&T Video Capture, an app that lets users stream video as they record it on their smartphones. A special bundle for broadcasters includes low-latency video ingest decoder software for live on-air reports. Another is Apple's FaceTime, which adds live video streaming from the iPad 2, the iPhone 4 and iPod touch, as well as a Mac.

"There are a lot of ways to stream live video that may ultimately eclipse what is being done by the industry," Geiger said. "A reporter with an iPad and a mobile wireless connection is pretty much in business."

However, industry consultant and publisher of the HDTV Executive Report Tore Nordahl said not so fast.

"Although helpful in the overall newsgathering environment, particularly in the area of hyperlocal reporting, Nordahl said, "the iPhone 'ENG tool' will not take market away from the professional mainstream HD ENG products required by TV stations' news operations to remain locally competitive."

Even so, equipping local journalists, news producers and others in the newsroom with a relatively low-cost smartphone should increase the opportunity for staffers to find, break and report stories as they happen upon them.

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A bright future

Several developments promise an even brighter future for IP newsgathering, including more efficient compression algorithms, new ways to access the Internet remotely with high bit rates and even more portable solutions for professional cameras.

In February 2012, the Joint Collaborative Team on Video Coding (JCT-VC) of ISO/IEC MPEG and ITU-T VCEG is expected to release the final draft of a new standard named High Efficiency Video Coding, also known as HEVC or H.265. It is anticipated that HEVC will encode video at lower bit rates than MPEG H.264 but at the same quality level.

The consequences of a more efficient compression algorithm will ripple throughout the broadcast industry and likely lead to the availability of smaller IP newsgathering wireless transport camera backs or even integration of this capability directly into ENG cameras.

"I think that the emerging HEVC or H.265 compression with lower bit rate and improved 4G upload speeds may help to reduce bonding complexity, perhaps to the point that only one 4G wireless upload circuit is required," Nordahl said. "Look for this by 2015, with early cameraback attempts using bonding and H.264 possibly by next year."

Omaha, NE, broadcaster WOWT-TV is equipped with backpack IP newsgathering technology as it moves away from traditional ENG trucks and toward mobile alternatives.

While the future is bright for IP newsgathering, it isn't likely to replace traditional ENG or SNG for quite a while.

"I estimate that wireless broadband HD ENG backhaul will be dominant by 2015," Nordahl said, "but microwave and satellite will still be in significant ENG backhaul use, because 4G/LTE will not have sufficient or reliable coverage in the fringe areas of many DMAs." BE

Phil Kurz regularly reports on the broadcast industry and is the writer of Broadcast Engineering's "OTT Trends and Technology" e-newsletter.

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Video description returns

Stations have until July 1, 2012, to comply.

BY HARRY C. MARTIN

As required by Congress in the "21st Century Communications and Video Accessibility Act of 2010," the FCC, effective Oct. 8, 2011, adopted rules requiring the provision of "video description" for the hearing impaired. Video description generally involves voice-overs describing a program's key visual elements. The FCC tried to impose such rules 10 years ago, but it was struck down by the U.S. Court of Appeals for the D.C. Circuit. At the time, the court concluded that Congress had not given the FCC the necessary authority to adopt such rules.

Video description was officially reinstated as of Oct. 8, but the new regulatory regime must first be approved under the Paperwork Reduction Act. In any event, broadcasters and MVPDs have until July 1, 2012, to come into full compliance.

Broadcasters and MVPDs will have the following obligations:

- *ABC, CBS, Fox and NBC affiliates located in the top 25 Nielsen television markets* (as of Jan. 1, 2012) must provide 50 hours per calendar quarter of video-described prime time or children's television. Be careful; Nielsen's top-25 market list could change before July 1, 2012. Note that by the end of 2016, the 50-hour rule will apply to the top 60 television markets.

ABC, CBS, Fox and NBC affiliates in top 25 Nielsen markets must provide 50 hours of video-described prime time or children's TV per quarter.

To count toward the 50-hour requirement, the programming must not have been previously aired with video description, on that particular channel or station, more than once. Only programming on the primary stream of digital broadcasters counts toward the 50-hour requirement. If another top-four network is carried on a secondary stream, however, it also must meet the 50-hour requirement, as though it were carried by a separate station.

- MVPDs with more than 50,000 subscribers must also provide 50 hours per calendar quarter of video-described prime time or children's television on the five most popular cable channels: USA, the Disney Channel, TNT, Nickelodeon and TBS. (The list of "top five popular cable channels" will be revised at three-year intervals, if ratings change.) ESPN and Fox News are not on the list because they provide fewer than 50 hours per quarter of programming that is not live or near-live (i.e., broadcast within 24 hours of recording). Live and near-live programming is exempt from the rules due to the difficulty in furnishing video description in such a short time frame.
- All network-affiliated broadcasters and all MVPDs must "pass through" video described programming to their viewers if the network provides it, so long as they have the technical capability to do so and that capability is not being used for another purpose related to the programming (such as an audio stream in another language). "Technical capability" means having all the necessary equipment except for items that would be of minimal cost. This requirement extends to secondary digital streams and to low-power broadcast stations. Any programming aired with description must always include description if re-aired on the same station or channel.

The FCC declined to carve out any special exemptions from these obligations for local programming, news programming and the like. The rationale: Since only four hours of programming per week must be video described, and stations and systems can choose what programming to describe, they can simply choose not to describe any programming that poses any particular difficulty. However, if a video-described program is interrupted by a breaking news bulletin, it will still count toward the 50 hours.

This is only a summary of the most important parts of the new rules, which cover six single-spaced pages and have many other provisions. A thorough reading is necessary to ensure compliance. BE

Harry C. Martin is a member of Fletcher, Heald and Hildreth, PLC.

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

Dateline

- On or before Dec. 1, 2011, noncommercial TV and Class A stations in Alabama and Georgia must file their biennial ownership reports.
- On or before Dec. 1, 2011, all commercial TV stations as well as all LPTV and Class A television stations must file biennial reports reflecting their ownership as of Oct. 1, 2011.
- By Dec. 1, TV and Class A TV stations in the following locations must place their 2011 EEO reports in their public files and post them on their websites: Alabama, Colorado, Connecticut, Georgia, Maine, Massachusetts, Minnesota, Montana, New Hampshire, North Dakota, Rhode Island, South Dakota and Vermont.

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ENABLING THE VIDEO ECONOMY™

Video compression technology

Web browsing and broadcasting are closer than ever.

BY ALDO CUGNINI

A media container is a "wrapper" that contains video, audio and data elements, and can function as a file entity or as an encapsulation method for a live stream. Because container formats are now starting to appear in broadcast situations, both OTA and online, it is useful to consider the various ways that compressed video (and audio) are carried therein, both by RF transmission and by the Internet. Earlier this year, we looked at how several container formats support different compression formats. This month, we'll look at a related development that will impact content distribution: HTML5.

Web browsing and broadcasting crossing over

The ubiquitous Web browser is a tool that users have come to rely on for accessing the Internet. Broadcasters already make use of this for their online presence, by authoring content and repurposing content specifically for Internet consumption. But browsing capability is something that will come to OTA broadcast as well, once features like non-real-time (NRT) content distribution become implemented. For example, by using the ATSC NRT specification, now under development, television receivers can be built that support different compression formats for cached video, including AVC video and MP3 audio, and different container file formats, such as the MP4 Multimedia Container Format. It is envisioned that these receivers will have the capability of acting as integrated live-and-cached content managers, and this will invariably involve support for different containers and codecs.

Among the key requirements of HTML5 are that it be device-independent and that it should reduce the need for external plug-ins.

For this reason, we need to understand how browsers and containers — two seemingly different technologies — are related in the way they handle content.

Several container formats currently provide encapsulation for video and audio, including MPEG Transport Stream, Microsoft Advanced Systems Format (ASF) and Audio Video Interleave (AVI) and Apple QuickTime. While not a container format per se, the new HTML5 language for browsers nonetheless has the capability of "encapsulating" video and audio for presentation to a user. With the older HTML, there was no convention for playing video and audio on a webpage; most video and audio have been played by the use of plug-ins, which integrate the video with the browser. However, not all browsers support the same plug-ins. HTML5 changes that by specifying a standard way to include video and audio, with video and audio "elements."

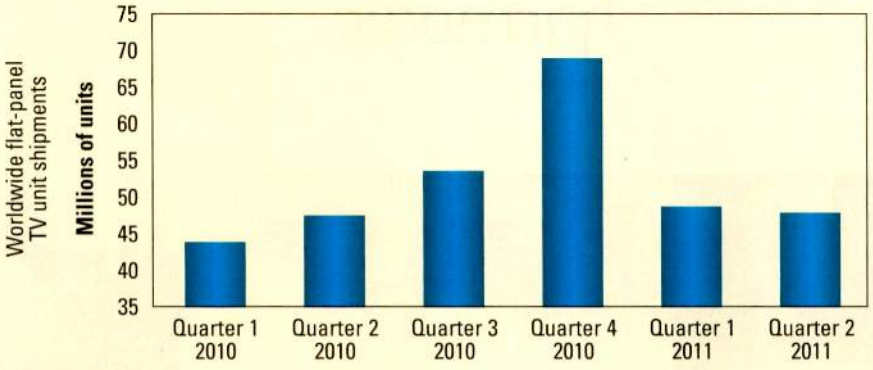
HTML5 is a new specification under development to replace the existing HTML used by Web browsers to present content since 1999. Among the

FRAME GRAB

A look at tomorrow's technology

Flat-panel TV shipments decrease slightly

Soft consumer demand in an uncertain global economic climate caused a slight dip in worldwide shipments of flat-panel televisions. For the quarter, global flat-panel TV shipments totalled 48 million units, down 1.3 percent from 48.7 million in the first quarter.



Source: IHS iSuppli Worldwide TV Market Tracker report *www.isuppli.com*

key requirements of HTML5 are that it be device-independent and that it should reduce the need for external plug-ins. Some of the new features in HTML5 include functions for embedding and controlling video and audio, graphics and interactive documents. For example, a "canvas" element using JavaScript allows for dynamic, scriptable rendering of precise 2-D shapes (paths, boxes, circles, etc.) and bitmap images. Other content-specific elements provide more control over text and graphics formatting and placement, much like a word processor, and new form controls support the use of calendars, clocks, e-mail and searching. Most modern browsers already support some of these features.

The HTML5 Working Group includes AOL, Apple, Google, IBM, Microsoft, Mozilla, Nokia, Opera and many other vendors. This working group has garnered support for including multiple video codecs (and container formats) within the specification, such as OGG Theora, Google's VP8 and H.264. However, there is currently no default video codec defined for HTML5. Ideally, the working group thinks that a default video format should have good compression, good image quality and a low processor load when decoding; they would like it to be royalty-free as well.

Multiple codecs present complex choices

HTML5 thus presents a potential solution to manufacturers and content providers that want to avoid licensed codecs such as Adobe Flash (FLV), while preferring the partially license-free H.264 (i.e., for Internet Broadcast AVC Video), and fully license-free VP8, Theora and other codecs. Flash, which has become popular on the Internet, most often contains video encoded using H.264, Sorenson Spark or On2's VP6 compression. The licensing agent MPEG-LA does not charge royalties for H.264 video delivered to the Internet without charge, but companies that develop products and services that encode and decode H.264 video do pay royalties. Adobe nonetheless provides a free license to the Flash Player decoder.

HTML5 can be thought of as HTML plus cascading style sheets (CSS) plus JavaScript. CSS is a language for describing the presentation of webpages, including colors, layout and fonts. This allows authors to adapt the presentation to different types of devices, such as large screens vs. small screens. Thus, content authored with HTML5 can serve as a "raw template," and repurposing to different devices entails generating appropriate CSS for each device. (This is known to programmers as separating "structure" from "presentation.") JavaScript is an implementation of ECMAScript, both of which are scripting languages that allow algorithms to be run on-the-fly in decoders. Because JavaScript code runs locally in a user's browser, the browser can respond to user input quickly, making interaction with an application highly responsive.

Cookies are not suitable for handling large amounts of data because they are sent to the server every time there is an information request.

Websites often use some form of detection to determine if the user's browser is capable of rendering and using all of the features of the HTML language. Because there is no specific "flag" that indicates browser support of HTML5, JavaScript can be used to check the browser for its functionality and support of specific HTML features. When such a script runs, it can create a global object that is stored locally and can be referenced to determine the supported local features. This way, the content being downloaded can "adapt" itself to the capabilities of different browsers (and decoder hardware). Scripts are not always needed for detection, however. For example, HTML code can be written, without the use of JavaScript, that embeds video into a website using the HTML5 "video" element, falling back to Flash automatically.

HTML5 also provides better support for local offline storage, with two new objects for storing user-associated data on the client (the playback hardware/software): *localStorage*, which stores data with no time limit, and *sessionStorage*, which stores data for one session. In the past, personalization data was stored using cookies. However, cookies are not suitable for handling large amounts of data because they are sent to the server every time there is an information request (such as a browser refresh or link access), which makes the operation slow and inefficient. With HTML5, the stored object data is transferred only when a server or client application needs it. Thus, it is possible to store large amounts of data locally without affecting browsing performance. In order to control the exchange of data, especially between different websites, a website can only access data stored by itself. HTML5 uses JavaScript to store and access the data.

Years ago, content developers predicted the crossover of television and Internet. With standard codecs, container formats and specifications like HTML5, integration of the two media will soon be common. BE

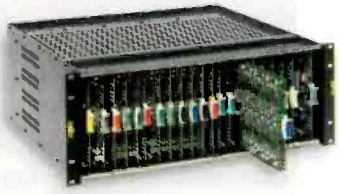
Aldo Cugnini is a consultant in the digital television industry.

? Send questions and comments to: aldo.cugnini@penton.com

PERFECT FIT

FORM

Wheatstone's television audio consoles are designed to fit where you really need them – in VERY tight spaces. All our surfaces open from the front for complete access to the inner workings. All of the audio, I/O and logic functions are located outside the control surface in rack-mount cages that can be located anywhere in your network. This is a huge plus when planning a new facility or retrofitting an existing one.



It also means these are a natural for production or on-air use in remote broadcast trucks.

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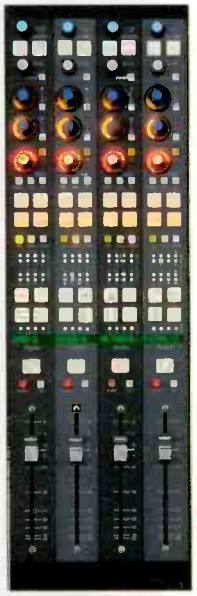

FUNCTION

Network First™ modular, networkable technology. It's the way Wheatstone consoles are designed and built. This means you can have the advantage of placing control surfaces, mix engines or interface boxes anywhere you want them, how ever you want them, without worrying about future access or

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DIMENSION ONE

D-8

WHEATSTONE IS TELEVISION AUDIO AT ITS FINEST

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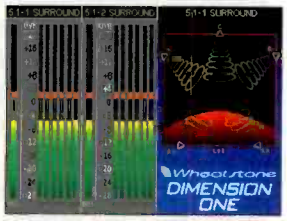

FOLLOW-THROUGH

In a world where service is becoming secondary, our pledge is this: Wheatstone will be there from the beginning for as long as you need us, any time, day or night. We've been building television audio consoles, right here in the USA for more than 25 years. We hand pick and QC every component we use to ensure the highest quality. Our designs are proven and our customer-first service gives you support in the field from our New Bern, NC factory and our San Francisco, CA facility. No matter what, we have your back.

PRICE

It's challenging out there and you've got to make certain that every piece of gear you purchase is perfect for your needs at a price that's better than seems possible...AND that it's going to last. Our design initiative dictates that every piece of equipment we make fits that criteria.Our **Dimension One** gives you big market features for a manageable mid-market price. Our **D-8** starts at under $65K! And our **D-32** provides layout flexibility to fit any

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D-32

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Continuation plans

Keep the lights on when things go wrong.

BY BRAD GILMER

Almost every media company has a requirement to keep the lights on when things go wrong. Most companies have a written plan that describes specific steps to take when a disruptive event occurs. These plans used to be called disaster recovery plans, but most have been renamed business continuation plans because a) not all outages are caused by a disaster, and b) the end goal is not to recover from a disaster, but to continue business operations regardless of what may come your way. This month, we will look at the critical components of a business continuation plan.

Plan components

A comprehensive plan will first lay out the scope, and then also identify what is out of scope. The plan will also describe its limits and the reasons for those. As professional media technologists, it is our natural inclination to focus on failures of the technical facilities under our control. However, I strongly encourage you to think outside the box and to involve people from other departments when you develop your plan. These experts can point out critical areas that you might overlook.

Ideally, top management should be involved in setting the overall scope of the plan and should determine, at a high level, what is not covered. After all, they are the customer. Should a disruption occur, they will have to accept the consequences of implementing the plan.

There is another reason to involve top management right at the beginning: Ultimately, any plan involves a tradeoff between risk and cost. Management will have to make some tough decisions about how much money they are willing to spend in this area. At some point, someone will have to decide that the cost to protect against some unlikely event is too much and that the company is willing accept a risk.

Strong foundation

To have a solid plan, you must have a good foundation. You may want to start with a few basic assumptions. For example, you may establish that:

- We will rate different areas of our business and assign different levels of protection to these areas based on these ratings.
- We will not protect for two (or three, or four?) simultaneous failures.
- We will include geographic diversity in our plan because our primary location is in an area that is subjected to tornado (earthquake, flood, etc.).

These are just some examples of statements you might want to make relative to your own facilities. You will need to develop your own.

Wide net

As you develop your plan, you should consider areas not normally within our area of responsibility. For example, we probably will consider a failure of electrical power in our plan, but would we consider an extended failure of our heating or cooling facilities? Some people would, but some would not. Professional media equipment may be concentrated in a technical area, and a failure of cooling may cause temperatures to rise quickly.

There may be other areas you might want to consider. Does your facility rely on pumps, fans or other mechanical devices to keep the facility on the air? If so, what steps can be taken to deal with a failure (or multiple failures) of these devices? What public utilities beyond electricity does your facility require in order to continue to operate? If you are in an area that becomes particularly cold in the winter, do you have alternative heat sources available if you are dependent on natural gas for heating? Are keyless access systems set to fail in an unlocked or a locked mode? If the batteries on the system run down, will you be able to get access to critical areas? Will you need to post guards to prevent entry into areas that are normally secured by these systems? Is your facility located in an area that is subject to flooding, especially if pumps or flood gates operated by the local municipality fail?

You get the idea. Be sure to widen your thinking and include others in your planning.

Time horizon

Another important aspect of business continuation planning is setting a time horizon. To some extent, this overlaps with setting the overall scope. For example, you may want to plan for the possibility that your core facility becomes inaccessible for one week due to ice and snow. You may also decide that you will plan for the total destruction of the facility due to fire or other natural disaster. But, you may decide that you are not going to plan for two months of inaccessibility, because how you respond would depend greatly on the cause of the disruption.

Practice

Once you have developed your plan, it is a good idea to test it. For example, if you have backup HVAC systems and an automatic changeover, you should fail your main system to see if the backup comes online as anticipated. You should fail power to the control system but keep alive power to air handlers, fans and other controls. Try to anticipate failures and to test various scenarios.

Of course, failing a main HVAC unit is fairly low risk. If the backup does not work, you probably have plenty of time to get the main back online

before things overheat. It may take planning and real guts (and support from management) to practice other scenarios. For example, you may find that disconnecting a main backbone path on your core router causes failures of DNS or other critical services. Frankly, some of these unanticipated failures might impact air. But, this is exactly the point of testing your plan. It is better to test the plan at a time when you are prepared to deal with the consequences rather than during an actual event when support staff may not be readily available. Again, top management should be involved and should support the idea of testing your business continuation plan.

Revise

Finally, bear in mind that almost from the moment you begin business continuation planning, your facility and your business are changing. This means you should think about how and when your plan is revised. There is nothing worse than having a false sense of security in thinking you have a plan, only to find out it is five years out of date, and half of it either does not apply, or worse, causes further disruption. Business continuity planning is not a one-time event; it is a commitment to an ongoing process.

Cartoon Network gas

Some time ago, when I was working at Turner Broadcasting System, I had an office directly behind Cartoon Network master control. Being in a secure technical area, my office had no windows. Normally I kept my office door open, but occasionally when I had to make a phone call, I closed the door in order to keep from being distracted by the antics of Bugs Bunny and Space Ghost.

One day, I had the door closed as I worked away on a project. I heard a loud knock, and a fireman in full rescue gear wearing a Scott Pack air rig and full face mask opened my door. He told me there was a natural gas leak (he had to repeat several times through the mask), and insisted that I leave the area immediately. It turns out that I was the last one to leave the building. As I walked past Cartoon Network master control, it was rather eerie to see programming playing away without a person in sight. Fortunately, adequate business continuation planning and implementation allowed the network to continue uninterrupted. BE

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

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

Mobile home

The crew car is your home on wheels, so take these steps to make it livable.

BY KEVIN JOHNSON

Most TV news photographers, like me, will tell you that they love this job because it doesn't involve going to an office. There are no cubicles or desks to sit behind. Instead, you take your "office" with you in your crew vehicle. Along with your standard-issue camera, tripod, lights and microphone, you need to carry tools to help you be prepared for any situation.

Comfort

Your crew car becomes your home away from home, so bring some of those creature comforts with you.

Every day in TV news is a road trip, so prepare your truck as if you're going to be driving for miles. Flash back to your youth, when four wheels, a full tank of gas and some friends meant endless possibilities. The only difference is the friend is your reporter for the day.

Every road trip needs a soundtrack, so bring some good music. Remote assignments can take you out of range of your favorite radio station, so reconnect with your favorite rock and roll (or country, gospel, hip-hop or soul) tunes with your own CDs or MP3 player. The unspoken rules of the road dictate that the driver picks the music, but since most photogs won't give away control of the steering wheel, at least let the reporter pick a few tracks.

A decent supply of non-perishable food and snacks will keep you recharged when the story takes you far away from fast food. A good candy bar might be the only thing that tames that grumpy reporter in the seat next to you, so bring some to share. Some bottled water and a small cooler should find a spot in the back seat as well. After the fine dining experience of a steering wheel cheeseburger, make sure you can clean up nicely with baby wipes or a roll of paper towels. Fast-food napkins only go so far.

Back in 2008, the Federal Highway Administration began requiring all news crews to wear reflective safety vests when near federal highways. Having a few vests, along with safety hard hats, prepares you for highway

Every day in TV news is a road trip, so plan accordingly. Every piece of equipment must be accounted for because not having the right part at the right time, down to a charged battery or full tank of gas, can mean missing a story.

Just as quickly as spot news can change your day, the weather can change on a moment's notice. Sunscreen helps on a sunny day. Bug repellent is a must-have in the woods. Stashing rain gear and umbrellas in your truck is a no-brainer. Just don't forget to have a spare extra-wide golf umbrella for your reporter. That might just save your live shot.

When it comes to weather tools, don't forget a simple hair dryer. Your reporter may try to borrow it after the rain storm, but its main purpose is to help dry out your camera and lens elements.

Safety

Ensuring your safety — and that of your colleagues — is the most important part of your job. No story is worth a major injury or death.

live shots and may even help you gain access to the neighborhood construction project.

After some time in a market, a photog gets to know streets like the back of his or her hand. That being said, when the assignment desk sends you running out the door with just a street address, the assistance of a GPS might be just the thing to get you to that spot news before the competition.

And, in case modern technology fails you, consider a set of "old fashioned" paper maps to guide you.

In the end, think of it as a camping trip, and bring all of the the comfort and safety items like flashlights, head lamps and matches to light your way.

Productivity

In the end, our job is all about visually telling a good story. We document

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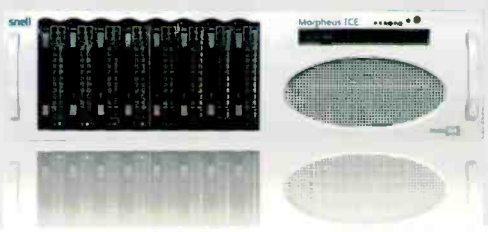

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the news and help explain it to the audience. Keeping your truck stocked with some basic technology will help you produce better stories on ever-shrinking deadlines.

Camera technology quality is improving by leaps and bounds while size and price are decreasing rapidly. Even though I don't like to lose the functionality of my full-size camera, little baby cameras make for the perfect companion. The new breed of inexpensive, practically disposable POV cameras, complete with waterproof housings and unique mounts, are just asking to be thrown in a pool or underwater in a rain storm. These unique perspectives can accentuate your stories, allowing your audience to see the topic from a totally new angle.

DC to AC power inverters aren't a luxury; they should be a staple in mobile TV news equipment. The average 400w inverter will allow you to run a small light for a quick standup in the field.

The laptop is becoming the center of your mobile broadcasting kit. You don't need a live truck anymore, as long as you have a camera, laptop with editing software and a high-speed wireless card. The next step in this evolution is the backpack unit, which allows you to connect your camera and push your video live over wireless connections. Combining the bandwidth of eight or 10 wireless cards allows you to feed back amazing quality HD footage from almost anywhere.

Technology is great, as long as you have batteries — and batteries never last long enough. If your story takes you out on the road all day, you need a way to recharge your "juice" while driving. The cigarette lighter port in most cars offers you 12V of DC power, which works perfectly on low-voltage technology like cell phones, GPS units, satellite radio receivers and laptops.

Also, be sure to have a good stash of power cords for all your devices. Here in Washington, D.C., the recent earthquake kicked us out of the building for the day. The entirety of our coverage was powered by a cigarette lighter. Don't forget a power splitter, so you can connect even more gizmos to your truck's power.

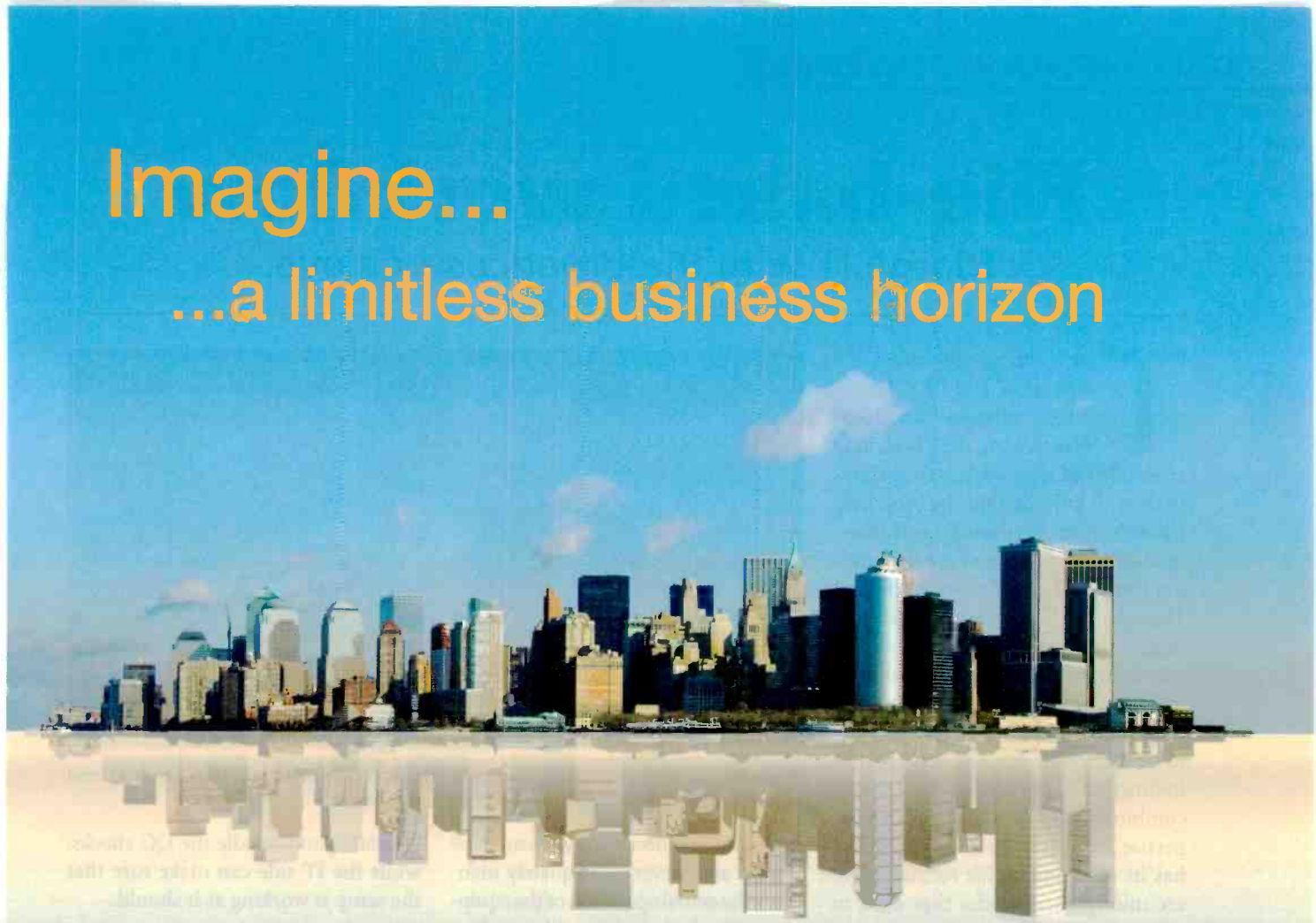
The best use of that cigarette lighter may be a DC to AC power inverter. This magic box plugs into the car's power and gives you standard AC outlets for battery chargers, lights and laptops. Be careful not to overload the inverter by keeping the wattage demand below its capacity. Your average 400w inverter will let you run a small light for a quick standup in the field.

Your crew car is the biggest piece of gear in your arsenal. It's your protection, your transportation and your office. Stock it well, and you'll be equipped for any story that comes your way. Plus, any and all adventures you'll see and experience through the windshield will always be much better than any ordinary corner office you can find. BE

Kevin Johnson is the founder of b-roll.net, an online industry resource for television photographers. He has been in the video field for 19 years and currently shoots for Cox Television News Bureau in Washington, D.C.

Imagine...

...a limitless business horizon



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- Improve productivity
- Expand your business potential

DALET

File-based workflow

Merge IT with the broadcaster's eye.

BY KIRK MARPLE

The emergence of OTT television and "TV Everywhere" distribution, combined with the dwindling availability of tape stock, is the primary driving force behind the broadcast transition to file-based workflows. In addition, consumers are demanding more and more mobile content. Though file-based workflows help make certain jobs easier, such as distribution to local or affiliate stations and the quick retrieval of archival content, there are still issues that need to be addressed. For the actual setup to function, there needs to be a strong combination of IT and broadcast expertise. As each distribution outlet has its own unique file format, there are multiple transcodes that need to be performed on a large amount of content in a short amount of time.

It is no longer the case that the quality of content earmarked for Internet distribution can be less than that of content for broadcast distribution. Broadcasters delivering content to such online outlets as iTunes and Netflix must grapple with the same QC issues as they do with traditional broadcast outlets. QC checks for audio, video and associated metadata must be in place. As each distribution method calls for its own specific file format, with associated parameters, these result in an increase in the volume of content being managed by an ever-decreasing staff. Automation is an important element in this scenario, as it lessens the load, but it is only effective when combined with a strong human support team combining IT and broadcast engineering expertise.

IT vs. broadcast quality

When it comes to developing and maintaining a file-based workflow, both IT and broadcast considerations must be taken into account. On the IT side, staff members must ensure the storage and server is adequately managing the actual operation of the equipment. On the broadcast side, workers must manage the quality of content that is being processed and eventually aired. IT personnel can handle such integration issues as getting content into the workflow and files out of it. Once all servers and software are in place and tested, the system can run itself. If an issue does arise, IT personnel can troubleshoot as they normally would when a typical exchange server goes down, until the issue is resolved.

When it comes to developing and maintaining a file-based workflow, both IT and broadcast considerations must be taken into account.

IT personnel can ensure that files are getting from point A to B, but often fall short in terms of checking the quality of content being sent out. Some of this has to do with the information tech having grown up with lower expectations of video and audio quality for online or mobile outlets due to previously lower standards. Those who have been looking at video all along for traditional broadcast will take a different approach, making sure the content is broadcast quality. It's hard to find one person that does it all well, but if there is one focused on each area, the two can work hand-in-hand. The broadcast side can set the standards and handle the QC checks, while the IT side can make sure that the setup is working as it should.

Automation is key

Even with the proper personnel in place, to make a file-based broadcast successful, technology must be involved. When it comes to the actual workflow setup, broadcasters aren't progressively adding human resources; they're adding server and physical hardware resources. As the volume of content isn't going down, the only way this setup works is if it is automated. Most broadcasters would not add 100 people to an organization to brute-force this increase in files. Instead, they will want staff to set parameters and use the automated technology to handle the rest.

There are many software and hardware options on the market that claim to be automated but in practice are not. How they are actually achieving automation is key to determining whether they can back up these claims. If a file needs to be reingested after each step in the workflow, then it is not automated. True automation is achieved when multiple processes are all integrated under one unified user

interface. This allows the file to move through all means of preparation, from ingest through to distribution, without human involvement. Some may think it necessary to start from scratch when developing or revising a current workflow to achieve these goals, but it is not necessary. What they need to look for is software that allows programs currently being used for processing to be integrated into one interface.

QC checks

QC falls under the umbrella of automation of processes. With the demand for Internet and mobile content to be of the same quality level as a traditional broadcast, media outlets need to rethink each part of the content going out, from audio and video to ancillary data. Soon, viewers will be demanding closed captioning for mobile content, and loudness regulations will make their way to the mobile arena. Broadcasters can prepare for these changes now by accommodating the transcoding of these different file formats, as well as preparing files to meet audio and video standards.

What types of file transcodes a software system can support is important, not only for compliance but also for media outlets that are changing their archive setup. A lot has changed since file-based workflows were first being implemented; broadcasters are converting file formats in archives to go along with new equipment or to better fit in with the needs of the outlet. To maintain the automation throughout, these processes should not be just merely added, but fully integrated into the current software workflow.

With software providing users with the capability to transcode files to most any format and even correcting for loudness and audio issues, how can one be sure that nothing has happened to the file during the process? Automated QC checks for audio, video and ancillary data need to be put in place to keep the process moving forward. Checks should be performed after media ingest to look for issues before moving a file into the preparation or transcoding stage. Users will also want to check content post-transcode, and before distribution, to mitigate the risk of sending out bad content. There is certain QC software available that will also quarantine a problem file, enabling users to decide how to proceed. This helps to further automate the process, as the problem files do not affect the rest of the files being processed and users do not have to reingest problem files.

Broadcast trafficking

It is also important to think through how and when one's processing software is connecting with the trafficking

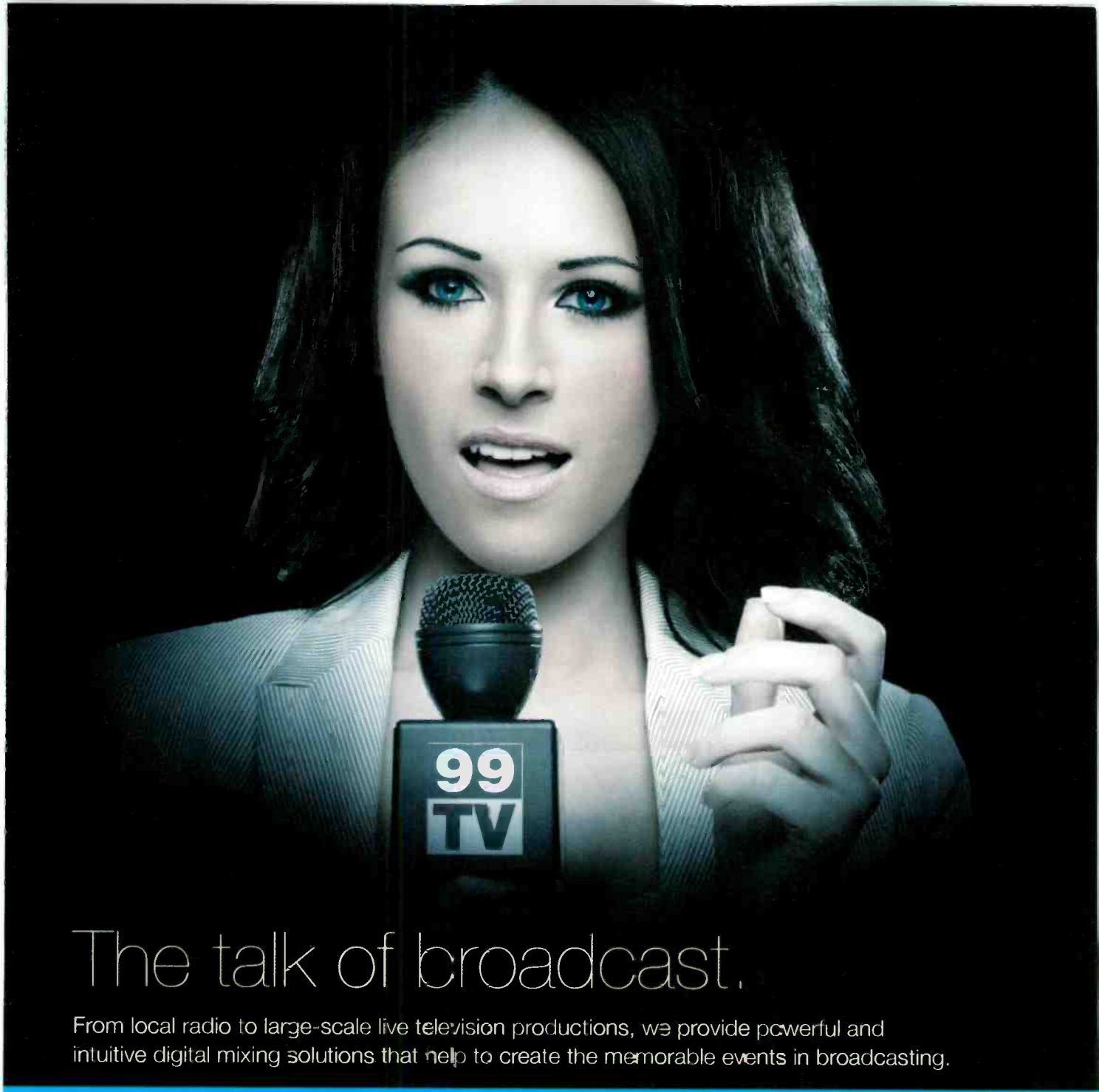
system. Previously, a trafficking system would only link up with the processing software when the file was fully ready for distribution. There is software available today that can bridge the gap between the archive and distribution. This makes it easier when coordinating separate advertising opportunities for each distribution method.

By linking the media processing software to the station's broadcast trafficking and rights system, users can schedule content by release date for air. This is assisted by such integration strategies as Broadcast Exchange Format (BXF) and Framework for Interoperability of Media Services (FIMS), which allow users to easily integrate their processing system with their broadcast trafficking system. As integration now takes place during the processing phase, the air schedule can be put in place at that time, along with the rules around it that are being handled or dictated by upstream business processes. Another process that should fall within this area is the detection of rights for an associated file. There is software that is available that can alert users if these rights are expired; if all of the right items are not in place, it will not allow the content to go to air.

Broadcast engineers and IT engineers have different, but complementary, skill sets. IT resources are needed to keep the systems running, focus on storage and networking support, and maintain the consistent data flow between the tiers of the workflow in their organization. Broadcast engineers are still needed for understanding the wide range of video/audio/caption specifications, and putting policies and workflows in place to maintain compatibility with the hardware resources used for playout to the consumers. Broadcast engineers are a vital resource in the QC process. Having a resource with "golden eyes" or "golden ears" is key to making the video the best quality for the consumer. Clear communication between both parties is essential when setting up and working with elements in a file based workflow, including broadcast trafficking systems. This allows both parties to understand the needs of all staff and limitations of the technologies involved.

Smart TVs have eclipsed 3-D TVs in sales, forcing broadcasters to streamline their workflow and the processes around that architecture. There is no standard format for these various distribution formats, further adding to the amount of content being managed. Automation helps to make sure that files are being moved forward, but it is only effective when combined with proper QC processes. BE

Kirk Marple is president and chief software architect of RadiantGrid Technologies.



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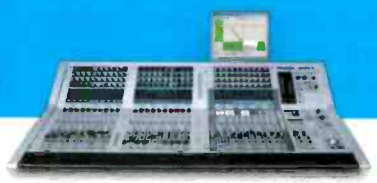

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STUDER
by HARMAN

Shown here are the Ross Vision 2ME switcher and the Midas Verona 240 audio board used in master control. (Photos courtesy of Jon B. Petersen.)

A new OETA

The Oklahoma Network now has more room and new tools to provide PBS programming.

BY ROGER NEWTON

From its origins in a basement classroom in 1953, the Oklahoma Educational Television Authority (OETA) has grown today into a statewide network that provides programming to 1.8 million viewers per week across Oklahoma and surrounding states. Known as The Oklahoma Network, the regional PBS program provider has its headquarters and main studios in Oklahoma City and a satellite facility in Tulsa. Also, there is an OETA transmitter 25mi southeast of the Tulsa facility — linked by fiber to the Oklahoma City operation.

From the Tulsa site, the network's staff creates a few stories each weeknight for the "Oklahoma News Report," OETA's statewide newscast. Live interviews from Tulsa are regularly conducted for a variety of network programming.

Making a move

In May, the Tulsa operation moved from a converted pizza restaurant, beneath an airport flight path, to an 11,000sq-ft, purpose-built, single-studio facility carved out of a parking lot on the campus of Oklahoma State University - Tulsa. Besides better access to downtown, better parking, better acoustics and a better view, the new facility offers 50 percent more space and state-of-the-art technology.

Following a year of careful preparation, the network broke ground on the facility in December 2009. Construction and systems integration for the new facility came together fairly quickly and on time. Planning was a group effort, including input from the production staff, PSA Dewberry architects and Dallas-based systems integrator Digital Resources. The building itself was completed in October 2010, at which point the

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The new studio measures 40ft by 50ft, with the lighting grid mounted 15ft above floor level.

In the technical operations center, 12 card cages are loaded with HD (3G), SD, analog video, digital audio and analog audio distribution amplifiers.

technical infrastructure could be installed and integrated. That process took almost seven additional months.

OETA had been in the previous facility for 27 years. Both layout and location were sub-optimal, as nobody anticipated such a long tenure when they first moved in. The prime motivation for the move to a new studio was the need to upgrade to HD in order to match the rest of the PBS network. As a result, very little of the hybrid digital/analog equipment was transferred from the old facility. Given the age and limitations of the old facility — tape sessions sometimes had to stop because of airplane and traffic noise — management determined that the HD upgrade represented the right opportunity to build a new facility. The OETA Foundation supported the cost of both the building and equipment.

Designed by PSA Dewberry, the new building is comprised of a large studio, two conference rooms and a dedicated green room/dressing room for guests.

The technical infrastructure of the new studio is built around routing switchers from Utah Scientific — two UTAH-400 routing switchers (one 3G HD video and one audio) controlled by the company's SC-4 control system.

One of the router's features especially valuable to the OETA team is auto-sensing, which recognizes the type of signal put into the video router and makes the appropriate conversion. Also important is the tight integration between the video and audio routers. The team chose the UTAH-400 audio and video routers to replace a

UTAH-300 analog router. The analog router served well for many years, so it was natural to go back to Utah Scientific for a new router. The company's sales and technical support were additional reasons for the choice.

Signal monitoring is accomplished using the VTM-4100 test set. One is used in the technical operations center, with two more in master control.

The routing system is supported by a full complement of new UTAH-100/3 series distribution amplifiers. Twelve card cages are loaded with HD (3G), SD, analog video, digital audio and analog audio DAs. The system's master timing references are generated by a pair of Utah Scientific TSG-490 sync generators with automatic changeover and GPS synchronization.

The new studio is 40ft by 50ft, with the lighting grid 15ft above floor level. There are 30 new lights — ARRI 650W lamps, 1K ST1 lamps, 1000W baby solar spots and 2000W baby zip soft lights. The Dove lighting system uses a 36/72 DMX console. The cameras selected for use in the studio are three Sony HDC1400R HD studio-configuration cameras with a fiber-optic interface. The cameras are outfitted with Canon BCTV Zoom KJ17ex7.7B lenses. The camera cable system selected is the Canare Fiber Optic Bulkhead system.

The 11,000sq-ft, building's construction began in May 2009 and finished in October of last year.

Signal monitoring in the facility is accomplished using the Harris Videotek VTM-4100 test set. One is used in the technical operations center (TOC), and there are two others used in master control — one at the director's station and the other at the camera shader position. Audio

monitoring in the TOC is accomplished with the use of a Wohler AMP1-V2DA digital monitor panel.

The monitors in the new facility are all flat-screen. The new video wall comprises six 24in Ikegami monitors, four are fed with a Miranda multiviewer system for monitoring the various sources, as well as the preview and program outputs from the switcher M/E busses — one for program and one for preview.

Design team

OETA: Robert Allen, foundation president; John McCarroll, executive director; Mark Norman, deputy director technology and implementation; Richard Ladd, director of engineering; Bill Thrash, station manager; Roger Newton, Tulsa chief engineer
Digital Resources: Tim Davis, director of engineering; Richard Bock, broadcast sales
Architects at PSA Dewberry

Technology at work

ARRI 1K ST1 lamps; 650W lamps;1000W baby solar spots; 2000W baby zip soft lights
Avid Newscutter editing system; Unity/ISIS shared storage system
Canare Fiber Optic Bulkhead system
Canon BCTV Zoom KJ17ex7.7B lenses
Clear-Com Eclipse Meridian intercom system
Dove lighting system, 36/72 DMX console
Ensemble Design BrightEye 30 analog to AES audio converters
Genelec 803A active monitoring system
Harris Videoteck VTM-4100 test set
Ikegami HLM-2450WB 24in LCD monitors
Liebert NX 60 kVA power supply
Midas Verona 240 audio board
Miranda multiviewer system
Ross Video Vision 2M/E HD switcher
Sony HDC-1400R studio cameras; PDW-F75 XDCAM disk recorders
Trane Package air conditioning units
Utah Scientific SC-4 control system; TSG 490 test pattern generator, two each, w/changeover unit; UTAH-100/3 series distribution amplifiers, video 3G/HD; UTAH-400 routing switchers

Quiet, please

One of the goals with the new facility was to separate master production control and the TOC. Previously, the control room was in a corner of the TOC, which often meant noise problems. As anticipated, separating the two resolved the issue.

OETA's Sony studio cameras feed into a Ross Vision 2M/E HD video production switcher in the TOC through two Utah Scientific distribution amplifiers. For audio, a Midas Verona 24-input with eight mix groups is used. These feed to Ensemble Design's BrightEye 30 analog to AES audio converters. The speakers in the control room are Genelec 803A active monitoring system.

Content originated in the field using Sony PDW-F350 XDCAM HD camcorder is uploaded to an Avid Unity/ISIS shared storage system in Oklahoma City over the fiber link. It is then edited in Tulsa using two four-year-old Avid Newscutter editing systems. (The editing suites were the only equipment brought over from the old quarters.) Previously, the team had to shoot its studio footage in SD and upconvert. With the new cameras and switcher, it is now shot

in HD from beginning to end. Both field acquisition and archiving are on XDCAM HD disks.

Something else the team has been able to do in the new facility is build in computer floors on the same level as the rest of the flooring, with cabling recessed in an 18in subfloor underneath. It has also grounded the TOC to a star system, a 20ft circle of 10ft metal stakes wired to a central ground.

Weather ready

Moderating Tulsa's notorious summer temperatures for the staff, and more importantly for the equipment, are two 10-ton Trane Package A/C units, one equipped with heating for the studio. Mindful of the problems experienced with noise before, the A/C and heating units were placed on top of the garage next door rather than on the roof of the studio building.

Given the dramatic nature of Oklahoma weather, a crucial upgrade was made to full backup power. During ice storms in 2007, for example, the Tulsa studio lost power for five days. At that time, shooting and editing continued using a portable generator to power one edit bay. Then, videotapes were driven to Oklahoma City for the newscast. There was no computer access, so reporters wrote their stories in longhand using kerosene lamps for light. It was back to the Stone Age.

Now, OETA has a 250kW backup generator and Liebert NX 60 kVA uninterruptible power supply to ensure that all technology keeps working even in the event of a power loss.

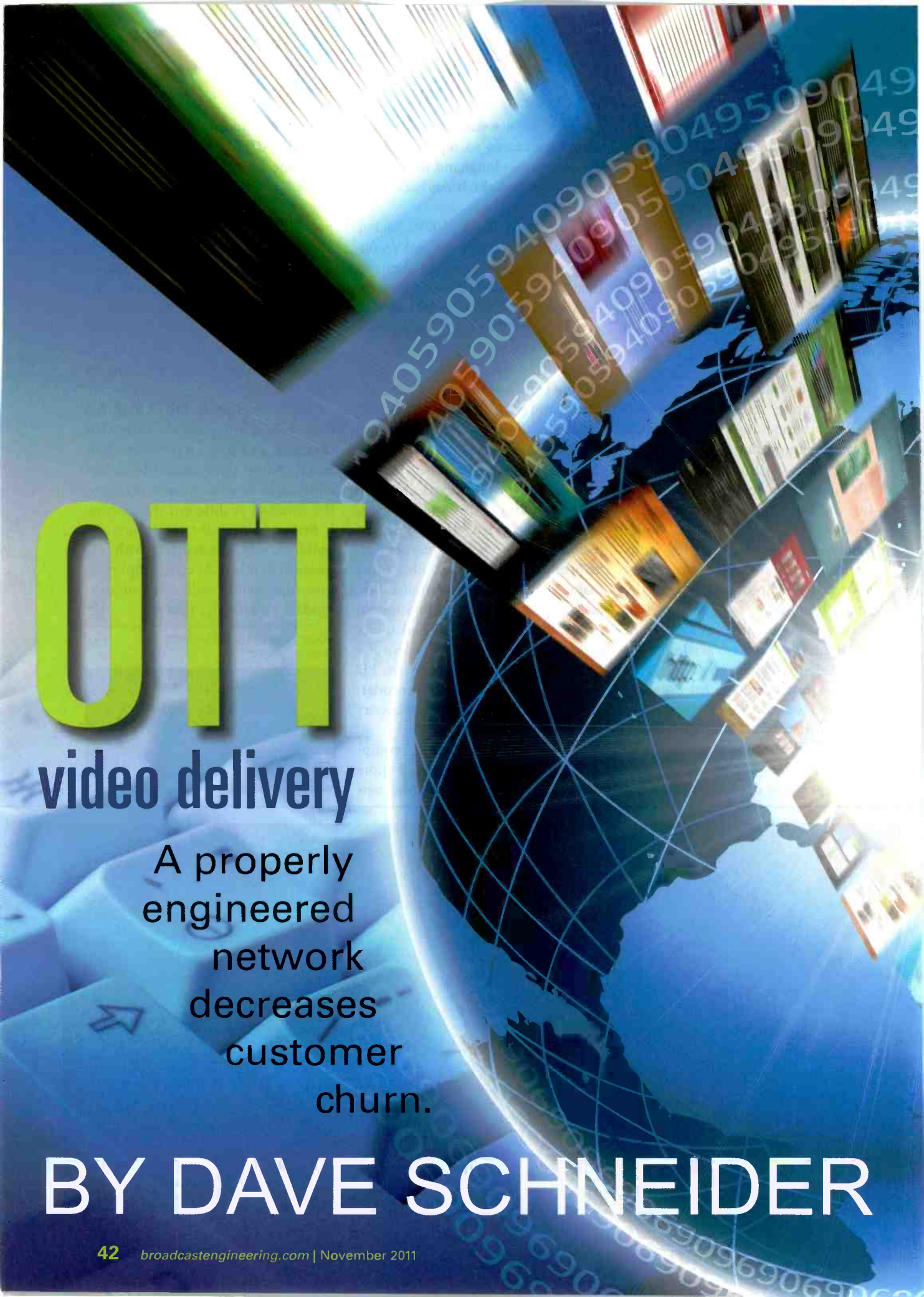
Because of close collaboration with the Oklahoma City studio — especially during the nightly newscast — a significant benefit of the new set-up is the Clear-Com Eclipse intercom system, which links the two operations over fiber so phone lines aren't tied up.

Getting the fiber link between the main studio in Oklahoma City and the new studio in Tulsa to carry the Avids, the live video stream, the intercom, the telephone and Internet traffic over one-half Gigabyte fiber was a major challenge. To accomplish this, assistance was sought from Superior Access Solutions' Rick Caballka, vice president of commercial sales, and Dave Werdin, founding partner, PE. OETA purchased MPEG-4 encoder/decoders to have the speed necessary for the live video stream.

Besides state-of-the-art equipment, improved location and more efficient all-HD workflow, the new facility has additional benefits. For example, OETA will be able, for the first time, to work with interns in the university's broadcast program, giving them practical experience and providing the network with extra staffing power. Another improvement is the dedicated green room/dressing room area for guests, who previously had to change in the restroom. The large conference room includes a catering kitchen, so events like board meetings can be hosted here.

For several years, OETA staff felt they were just making do with what they had, and it was a constant challenge. Now, with state-of-the art equipment in a brand new building, the mindset is different. Everything is first-rate. And, for the future, the building was constructed with expansion in mind. At eight employees now, the facility will easily accommodate a staff twice that size. BE

Roger Newton is OETA Tulsa chief engineer.



OTT video delivery

A properly engineered network decreases customer churn.

BY DAVE SCHNEIDER

OTT video, or streaming media, is an evolving set of technologies that deliver multimedia content over the Internet and private networks. A number of online media platforms are dedicated to streaming media delivery, including YouTube, Brightcove, Vimeo, Metacafe, BBC and Hulu. Streaming video delivery is growing dramatically. According to the comScore 2009 U.S. Digital Year in Review Video Metrix, Americans viewed a significantly higher number of videos in 2009 than in 2008 (up by 19 percent) because of both increased content consumption and the growing number of video ads delivered. (See Figure 1 on page 44.) In January 2010, more than 170 million viewers watched videos online. The average online viewer consumed 187 videos in December 2009, up 95 percent over the previous year, and the average video duration grew from 3.2 to 4.1 minutes. Hulu, for example, in that same month delivered more than 1 billion streams for a total of 97 million hours. According to comScore, the character of video viewing is changing as well, with more people watching longer content.

There is a growing effort by broadcasters to make regular TV content available online. For example, the BBC has developed the BBC iPlayer and the bbc.co.uk website to support replication of most BBC broadcast material. The service has been outstandingly successful: 79.3 million requests were serviced in October 2009. NBC coverage of the 2010 Winter Olympics included live and recently recorded content, complete with commercials.

Whenever there is the possibility of a large or dynamic viewer audience, a reliable CDN is required. CDNs once only used to replicate website content around the world. Now, they have expanded dramatically to handle streaming media. Research and markets estimated the value of CDN services for 2008 at $1.25 billion, up 32 percent from 2007. Top CDNs include Akamai, Mirror Image Internet, Limelight Networks, CDNetworks and Level 3. Streaming media services must deal with content collected from disparate sources and distributed to a growing number of devices. (See Figure 2.)

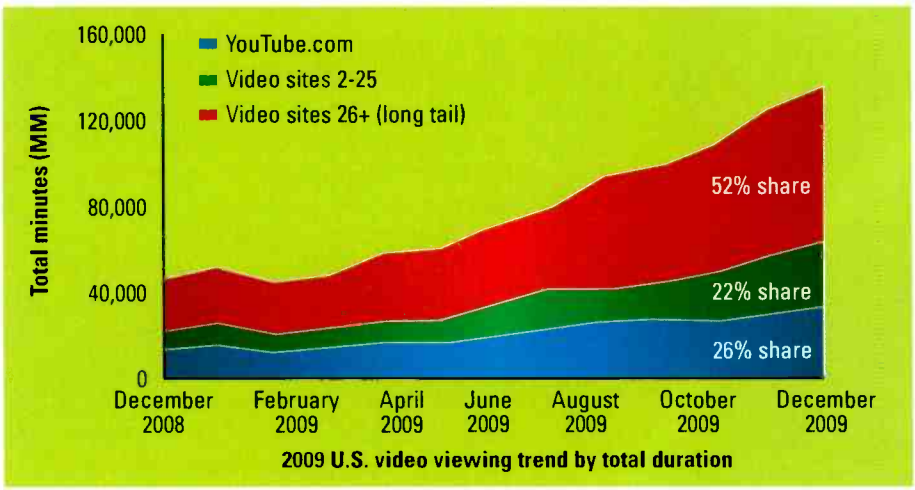


Figure 1. Americans viewed a significantly higher number of videos in 2009 than in 2008.

Technology trends

The most common network protocol used to transport video over IP networks is the Real Time Streaming Protocol (RTSP). RTSP is a stateful protocol used to establish and control media sessions between a media server and client viewer. RTSP clients issue VCR-like commands to control media playback. The transmission of the audio/video stream itself is most often handled by the Real-time Transport Protocol (RTP), although some vendors have implemented their own transport protocol. RTSP and RTP are almost universally used to implement VOD features.

Most video players, such as the Adobe Flash Player, use proprietary protocols that provide additional functionality and flexibility. Flash Player has an almost total presence on PCs and Macs, and is used to deliver more than 80 percent of online videos. The Adobe Flash Player is a lightweight client embedded in Web browsers. Adobe uses the Real Time Messaging Protocol (RTMP) to deliver streaming content, providing multiple independent channels, which are used to control and deliver content. RTMPT is an RTMP variant that encapsulates RTMP packets in HTTP.

First released in 2007, Microsoft's Silverlight player is growing in popularity within the player market. The Silverlight player uses HTTP as its top-level transport mechanism and for media streaming. Using HTTP as a single transport mechanism can result in significant internal cost reduction for end-to-end delivery. Silverlight includes digital rights management (DRM) features similar to those available in Adobe Flash.

HTTP Live Streaming (HLS) is a media streaming specification that is developed by Apple that uses HTTP as the transport. Devices such as the iPhone, iPad and Apple-compatible platforms support this streaming

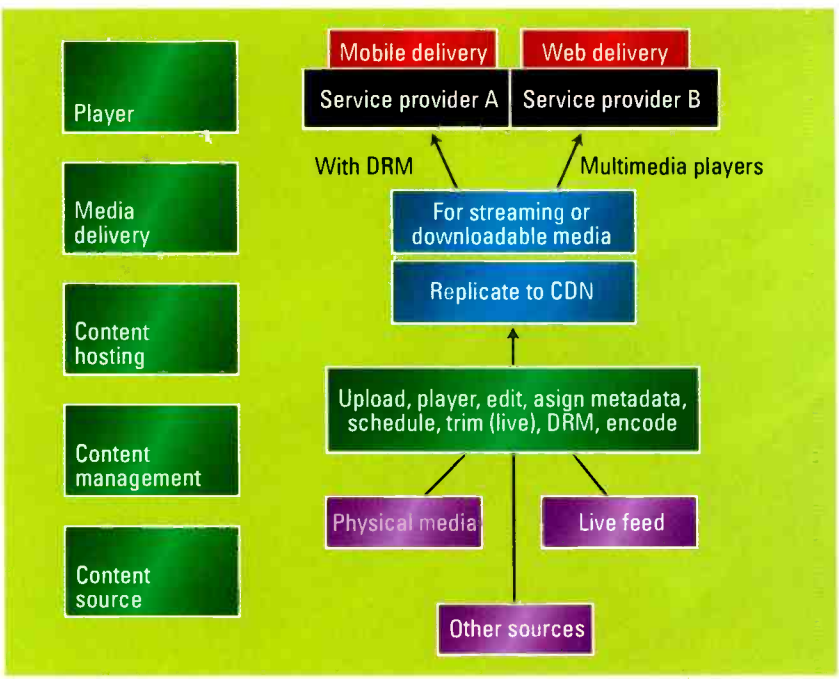


Figure 2. Streaming media services have many content sources and destinations.

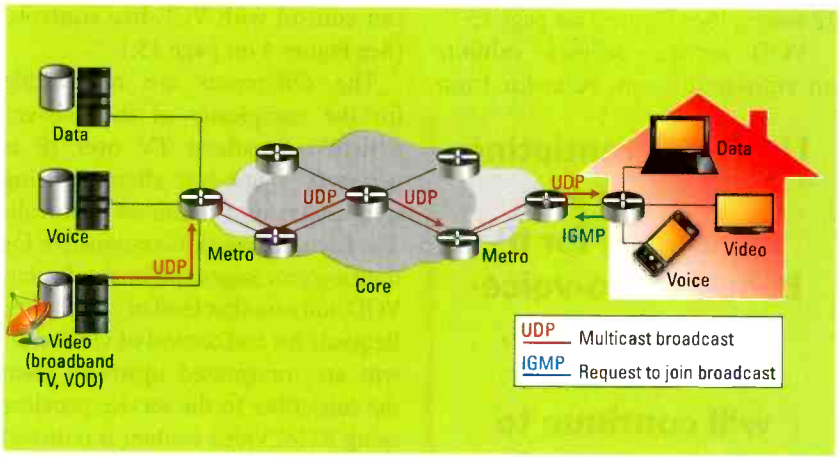


Figure 3. Linear IPTV broadcasts are sent over efficient multicast IP routes.

technology. The "Live" is misleading in the name, as this technology works for on-demand and live streaming. HLS supports streaming media that is segmented into smaller chunks of data, to improve delivery and user experience. An Extended M3U Playlist format file is used that contains the media segments to download.

Modern streaming media technologies adapt to changing network conditions, especially those related to mobile devices.

Modern streaming media technologies adapt to changing network conditions, especially those related to mobile devices. As conditions degrade or improve, the player requests an alternate lower or higher bit rate media stream. Multiple flows are prebuilt or constructed at multiple bit rates and divided into chunks so that a player can seamlessly switch different flows. The ability for a video player to adapt to varying network conditions is termed differently across players. In the Silverlight player, it is called smooth streaming; Adobe Flash 10.1 terms it dynamic streaming; and Apple iPhone's HLS refers to it as adaptive streaming.

How is IPTV delivered?

Delivery of video to the consumer has undergone rapid change in recent years and is guaranteed to continue to do so in the future. Cable TV networks deliver a large range of

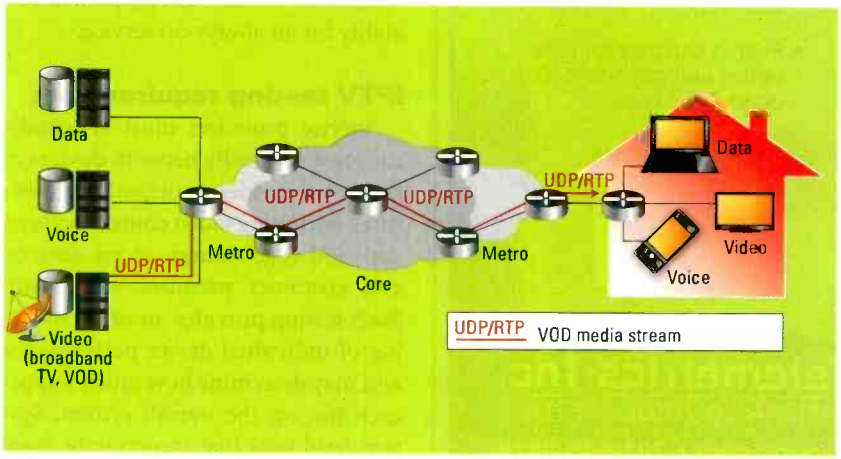


Figure 4. For VOD content, each subscriber receives his or her own video flow.

content, and the ability to provide user interactive features, including VOD. Carrying the most promise for the future is delivery of video over multiservice IP networks. This is commonly referred to as IPTV. It is delivered as a triple-play service to consumers that include high-speed Internet (HSI) and VoIP.

Video over IP information flow

The major components and data flow in IPTV networks consists of media and control flowing between content servers and home networks.

The two types of video services delivered are linear broadcast and VOD. Both have dramatically different characteristics that affect the networks that handle them. Broadcasts are regularly scheduled programs sent to large numbers of subscribers. It is sent efficiently over multicast IP routes. (See Figure 3 on page 45.)

VOD service delivery exhibits an entirely different behavior from linear broadcast service. Stored videos are sent to the subscriber on demand. Each subscriber receives his or her own video flow, which they can control with VCR-like controls. (See Figure 4 on page 45.)

Until differentiating services are developed for IP-based video-voice-data networks, IPTV services will continue to be compared with traditional TV, cable and satellite service.

The differences are responsible for the complexity of the delivery network. Broadcast TV over IP is primarily a one-way channel, using well-understood multicast protocols. The home network is responsible for multicast messages and image display. VOD adds another level of complexity. Requests for and control of video content are transmitted upstream from the subscriber to the service provider using RTSP. Video content is returned to the subscriber through RTP.

IPTV delivery challenges

Until differentiating services are developed for IP-based video-voice-data networks, IPTV services will continue to be compared with traditional TV, cable and satellite service. As such, the IP delivery network must remain transparent to customers. Customers expect video quality and service availability to be on par or better to make the switch. With multiple choices available to consumers, there is little tolerance for poor quality and operational problems. A poorly engineered network can lead to substantial customer churn.

To successfully deploy IPTV, the following end-user requirements must be addressed:

- *Video quality:* Subscribers' perception of quality must be the same or better than other alternatives;
- *Minimal channel change delay:* Because instant response is expected; and
- *Assured service delivery* and availability for an always-on service.

IPTV testing requirements

Service providers must systematically test and verify network devices in each of the video transport architectures, including video content servers, core and edge routers, access devices, and customer premises equipment. Such testing provides an understanding of individual device performance and may determine how much impact each has on the overall system. System-level tests that incorporate more than one demarcation point in the

transport architecture are required. In this way, a clear understanding of how well the individual systems play with each other is determined. Finally, the network must be tested end-to-end. Most standard routing and forwarding performance tests should be performed, looking at packet loss or latency under different load conditions.

Test methodologies

All types of video testing, both OTT and IPTV, require testing through large-scale subscriber emulation. That is, large user communities must be simulated performing "normal" activities in order to exercise video components, subsystems and end-to-end delivery. "Normal" activity is directly related to the type of video delivery.

IPTV

Broadcast IPTV delivery is highly dependent on multicast operation. In order to avoid sending individual programs to individual users, all viewed channels are broadcast to all users wishing to view particular channels. It is up to the STB and all routers between the source(s) and the subscriber(s) to join and leave multicast groups that correspond to a particular broadcast stream.

Broadcast IPTV testing requires emulation of subscribers engaged in two types of behavior:

- Requesting a channel (joining a multicast group), watching for a period of time and then requesting an alternate channel (leaving one group and joining another); and
- Rapidly changing channels, often called "channel zapping".

During this type of testing, the critical measurements are:

- *Video quality*, largely related to jitter and drop outs. Several types of quality of experience metrics, including VMOS and VQMon, produce values that are closely related to how viewers "feel" about their experience;
- *Channel change latency* — that is, the time between channel change request and response.

VOD

VOD stream delivery is point-to-point, as opposed to multicast. VOD users have VCR-like buttons at their disposal: play, pause, fast forward, rewind and stop. VOD testing requires emulation of subscribers engaged mostly in viewing and occasionally in VCR-like control activities.

During this type of testing, the critical measurements are:

- *Video quality*, as described above; and
- *Command latency* — that is, response to VCR-like control activities.

OTT

OTT delivery is also point-to-point, and testing requires emulation of large audiences of users accessing a larger set of possible sources than with VOD. The same VCR-like controls are available, but due to the generally short nature of OTT content, are generally used less often.

What differentiates OTT from VOD and makes it much more difficult to test is changing connection rates. OTT content is saved many times over at the source for delivery at many different connection rates — for example, high resolution for broadband connections and low resolution for mobile devices. OTT delivery must quickly and transparently switch between streams based on conditions dictated by the consumer.

OTT testing, therefore, must emulate frequent bandwidth changes from a large community of users accessing many possible streams. During this type of testing, the critical measurements are:

- *Video quality*, as described above. Empirically, one's expectations of quality for this OTT delivery are much less than broadcast TV;
- *Smooth presentation*. As bandwidth availability changes, consumers must not be aware of the changeover of streams. That is, there should be no noticeable pauses. BE

Dave Schneider is senior market development manager at Ixia.

Many broadcasters continue to search for ways to keep playout efficient while turning to some form of centralcasting. As part of that, they are using tools such as the Snell Morpheus system.

CENTRALCASTING

As trends and technology change, efficient playout is as important as ever.

BY NEIL MAYCOCK

The changing nature of media consumption has transformed the broadcast business model. Broadcasters are delivering a proliferation of media-related services to broader audiences via additional outlets and platforms. As the number of offerings has grown, however, average revenue per service has dropped. In a tough economic climate, and with IPTV and VOD services gaining ground, broadcasters face constant competitive and price pressures. And, while trends and evolving technologies continue to shape products, broadcasters are finding that it's more important than ever that their established channel playout operations run as efficiently as possible.

Over the past decade, station groups and origination facilities have considered centralization of operations and infrastructures as a means of reducing the resources — including equipment and staff — required for playout across multiple facilities. In this shift, such organizations are finding that savings promised by centralcasting models can be realized only if the project is guided by business goals rather than by adoption of new technology for technology's sake.

While defining their business goals for a centralcasting model, broadcast groups and origination facilities must evaluate current processes and determine where costs and the greatest inefficiencies occur. They also must maintain as a priority the ability of local stations to maintain their own branding and elements such as sports, news and weather that are fundamental not only to their identities, but also to their community value. In essence, the facility must implement technology and infrastructure that support a balance of centralization and localization.

Multicasting models

Within centralcasting's landscape, two models have emerged. In the first of these, the multi-region facility model, the automation system's sophistication at the hub supports highly-efficient playout of primary content, as well as regional variations, across all sites. On page 50, Figure 1 demonstrates a centralcasting model employed by a multiregional facility sending feeds all across the country.

Within the facility, external traffic systems provide the automation system with both common and local programming schedules. This centralized control scheme allows single operators to manage several channels from one workstation. While common scheduling (represented by blue blocks) is delivered according to the playout schedule, four different blocks (purple, green, yellow and red) of programming are sent out to fulfill variable schedules for different regions. Each region then has local programming within breaks in common programming (a regional movie interrupted by local news, for example).

The second model, the one that has gained the most interest across the United States, is the distributed "hub-and-spoke." As the name suggests, the model depends on a central control facility that serves as the hub of operations and maintains control over multiple regional sites. (See Figure 2 on page 50.) Often, each of these "spoke" sites maintains playout capabilities, complete with local storage, graphics and branding. To keep deployment cost low, station groups have turned to standard IT-based platforms that, in the software domain, have integrated multiple functions ranging from video playback to graphics and video effects, as well as ancillary functions such as insertion of VANC and closed-caption data.

A popular hub-and-spoke implementation is the "store-and-forward" model. In this set-up, the hub is responsible for aggregating content, transcoding it as required, and quality control. Processed at the hub, the scheduled playlist triggers the distribution of long-form programming from the hub over a WAN to edge servers at the spoke sites ahead of the target broadcast time. Though content is delivered ahead of playout, the hub maintains real-time control over playout at the spoke.

Regional sites typically are outfitted with scaled-down automation systems that are largely controlled by the hub, but also capable enough to assume real-time control over local content, playlists and broadcasts. Or, it can even provide disaster recovery services for another station within the group if circumstances warrant. Local storage not only simplifies playout over multiple time zones, but also provides added redundancy and resiliency to WAN interruptions or failures.

Equipped with media management tied into the hub, each spoke also can leverage content transfer capabilities, archive and management systems at the hub. Content can be moved securely and reliably between hub-and-spoke sites in either direction. Thus, whether for programming hours dedicated to local news and sports, disaster events or other operational necessity, the hub site can hand off programming to spoke sites that can perform cost-effective, regional playout with dedicated branding, including promos and snipes. The converse is true overnight and during times when little or no local content is planned. The hub site, staffed by a minimal complement of operators, can control centralized playout for dozens of spoke sites.

Though the degree of centralization differs depending on how the hub-and-spoke is implemented, the benefits of today's centralcasting models are clear. By leveraging file-based content distribution from the hub, the broadcast group can manage a high volume of programming efficiently and realize economies of scale across key playout operations.

The hub delivers file-based content to spokes, thereby not only providing less-expensive and more redundant centralized storage of high-value assets, but also reducing overall time and cost required for processing or repurposing of content for multiple sites. Most of the equipment used for preparation of media (servers, storage systems and other large hardware systems) is situated at the hub, where tape- and file-based ingest, as well as metadata markup, are performed

centrally both through manual operation and automated processes, including file transport, technical QC, subtitling, and confirmation of rights and licensing.

Multicasting done right

A successful hub-and-spoke is possible through deployment of automation technology that supports a high degree of centralization while facilitating simple playout of localized content. The key challenge in moving to centralcasting is maintaining the local identity of individual broadcast stations. Technically speaking, broadcasters can only meet this challenge if their automation systems give them the agility to intermingle with shared content from the hub. As automation systems at the hub become better managers of intricate, channel playout scenarios, the rising availability of cost-effective, single-box playout solutions is giving local stations the ability to opt out of central control and take on playout and branding for live local events.

Also critical to a centralcasting model is the broadcast group's ability to move files efficiently across the WAN. It's one thing to move video files from rack to rack; it's another to use many different fiber paths, all with different "ping" times. This inconsistency can be problematic. When complex live programming is distributed across the network, an automation system must be able to trigger frame-accurate insertion of regional content across select sites. By addressing this issue in advance, the broadcast group can determine how, and how well, each station handles "join-in-progress" scenarios and other challenging live situations. Interfaces between automation and file-acceleration solutions can help to ensure that the tremendous volume of programming pushed from hub to spokes arrives reliably, as and when it should.

Advances in automation, file delivery over WANs and greater availability of affordable channel-in-a-box solutions (optimal for spoke sites) are enabling broadcast groups and origination facilities to streamline overall operations while preserving cost-effective playout on the local level. In implementing a centralcasting model, the group or facility also must account for future needs and further evolution of their broadcast and media delivery services. Flexible automation solutions not only facilitate more efficient channel playout, but also provide the headroom and adaptability required for growth and integration with new third-party devices. When complemented by ongoing support and development from the vendor, such automation systems help broadcasters to implement centralcasting models that maximize the value of their channel playout operations. BE

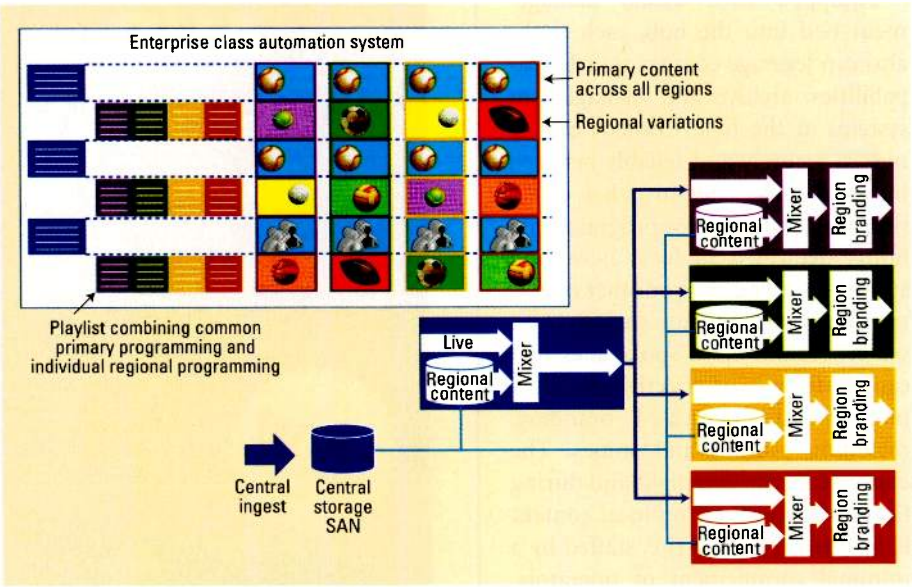


Figure 1. In the multi-region model, a central source is in control and allows for handoffs between common and regional playout. Inserting local news into breaks during a common movie is one example.

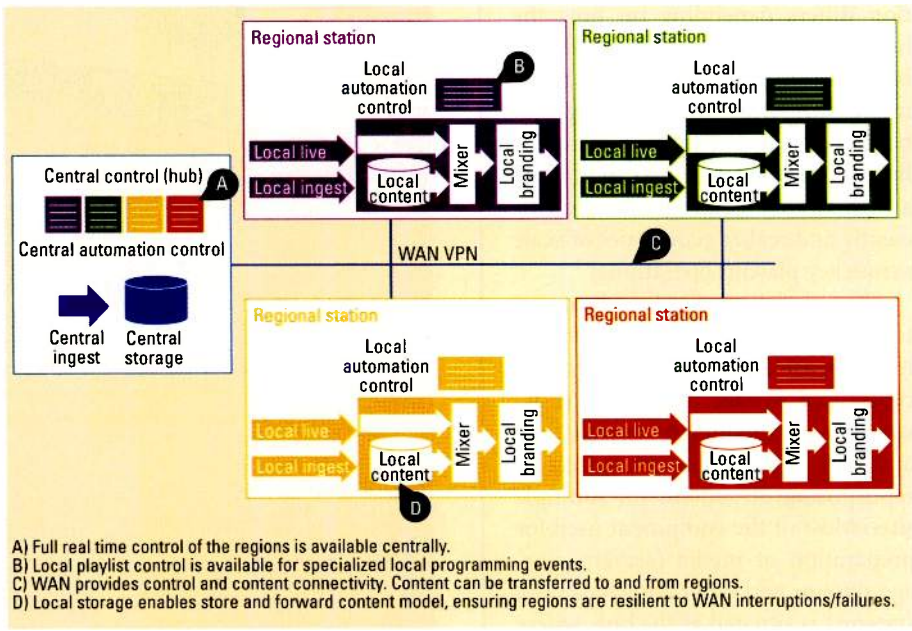


Figure 2. The hub-and-spoke model depends on a central control facility that serves as the hub of operations and maintains control over multiple regional sites.

Neil Maycock is chief architect at Snell.

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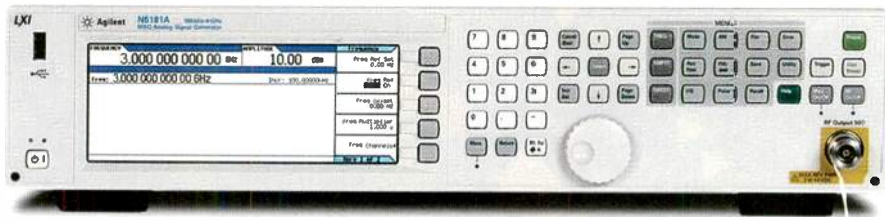

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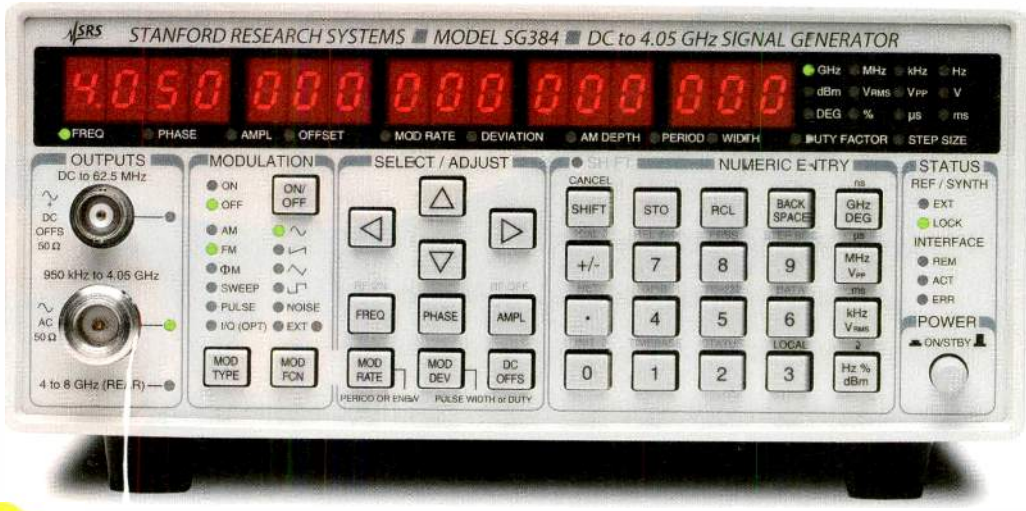

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8-VSB signal measurements

BY GLEN KROPUENSKE

Solve reception problems with these five key tests.

Since the shut-off of analog signals, most broadcasters have received calls from viewers regarding their inability to receive the station's signal. The quick answer is to check the theoretical footprint and assure viewers that they should be getting a good clean signal, and ask them to adjust their antenna or check the setup on their receiver. But after the call, a broadcaster is left wondering how the RF signal quality really is in a certain area.

When investigating reception complaints, there is a more productive approach to take since most broadcasters are monitoring and testing all video and MPEG signals in their facilities. They can simply extend this monitoring function to analyze the transmitter's RF signal and specific viewer locations. The RF leg in the signal chain is vital to ensuring quality and reliable reception.

Tools for taking 8-VSB measurements are available in different forms, including handheld SLMs and USB PC probes. They show and quantify problems, and also relate reception difficulties to their causes. These simple measurements can also point to transmitter or transmit antenna issues that may require attention.

Five simple measurements for proving signal quality

An 8-VSB measurement receiver provides analysis and insight into transmission or reception impairments with several key analyzing tests. These include:

- Visual — constellation and eye diagram analysis;
- Quantitative MER, EVM analysis;
- BER analysis;
- Level dBmV measurement; and
- Digital channel spectrum analyzer analysis.

Constellation diagram analysis

The receiver's demodulator is locked to the pilot carrier recovering I and Q amplitude and phase samples at the center of the symbol sample time. Plotted on a visual chart called a constellation diagram, these samples indicate how the detected I and Q signals vary from the ideal. (See Figure 1.) The I signal amplitude is used to recover the symbol values (-7 to +7).

Figure 1: While subjective, the constellation diagram provides a comprehensive visual indication of the 8-VSB channel signal quality.

The vertical lines on the constellation diagram represent the eight amplitude levels in 8-VSB. If I/Q samples fall on the vertical lines, this indicates the I (amplitude) component is ideal to the 8-VSB symbol.

Note: The position of the sample measured vertically along the symbol line indicates the value of the Q component. The Q component is not used for 8-VSB symbol recovery but is transmitted and used in signal quality analysis.

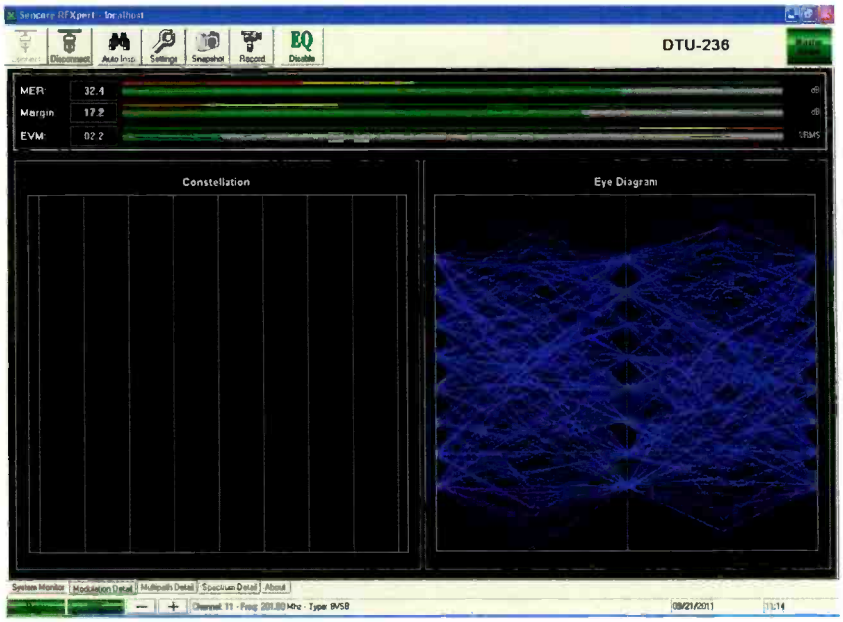


Figure 2. An eye diagram also shows RF reception signal quality. As the signal worsens, the eyes collapse.

RF propagation and/or receiver influences can cause the sample points to fall to the left or right of the lines. When plotted I/Q samples are close to the lines, the receiver easily distinguishes the eight discrete symbol levels and recovers the proper symbol values. If the samples spread away from the lines, this indicates detected I/Q signal variations. If the variations grow too large and samples for one symbol level cross over to the adjacent symbol level, a symbol error results. While subjective, the constellation diagram provides a comprehensive visual indication of the 8-VSB channel signal quality.

Note: An eye diagram also shows RF reception signal quality. The seven center eye openings should be open and defined. Worsening signals collapse the eyes. (See Figure 2.)

MER, EVM

When time demands a single quantitative value to assess signal quality and relate it to the ability of a receiver to decode properly, the modulation error ratio (MER) measurement is referenced. MER is the ratio of the power of the signal to the power of the error vectors expressed in dB. For simplicity, MER is often described as the digital channel equivalent of an analog signal-to-noise ratio measurement.

Considering the constellation diagram, MER compares the actual location of a received symbol (I and Q voltage vectors) with its ideal location. (See Figure 3.) As the signal degrades, the received symbols are located further from their ideal locations and the measured MER values decrease. As location errors further worsen, the MER values decrease eventually to the point that symbols are incorrectly interpreted as adjacent symbols.

The larger the MER value, the better the signal quality. Typical performance of an 8-VSB transmitter should approach, if not exceed, a MER value of 30dB. A typical 8-VSB receiver can decode down to a MER of approximately 15dB. However, increasing signal power to a MER of 18dB or greater helps avoid teetering on the digital cliff. (See Figure 4 on page 55.)

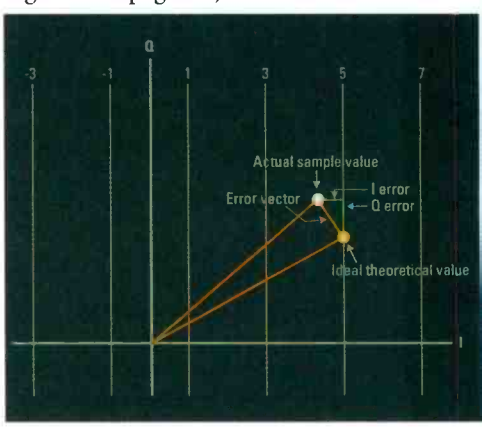


Figure 3. MER compares the actual location of a received symbol (I and Q voltage vectors) with its ideal location.

Figure 4. For MER, the larger the value, the better the signal quality. Typical performance of an 8-VSB transmitter should approach, if not exceed, a value of 30dB.

Note: A margin measurement associated with MER represents how far the MER value is from a typical receiver's threshold of visibility (TOV) or "digital cliff." A typical TOV for 8-VSB is 15.2dB.

MER measurements may be expressed as an error vector magnitude (EVM) value. EVM is a percentage RMS value that represents the amplitude ratio of the RMS error vector amplitude to the largest symbol amplitude. EVM is the opposite of MER, since the lower the EVM percent value, the better the signal quality. EVM values for receivable signals range from 2 to 11 percent. EVM values above 10 percent quickly approach the TOV cliff. (Note: MER of 18 = EVM of 11.7 percent.)

BER analysis

To this point the measurements have been all demodulator-based, reflecting RF impairments. Further measurements gauge a receiver's ability to recover the MPEG packets. BER measurements indicate in real time the receiver's ability to decode and correct errors in the MPEG packets.

BER is a ratio of the number of bit errors to the total number of bits sent in a 1-second interval. The BER ratio or result should be a very small number, and it is expressed as a number times 10 with a negative exponent as

the multiplier. A BER measurement is made possible by error correction encoding, providing the receiver with the ability to detect and count errors of the actual digital RF channel in real time.

The BER measurements before (pre) and after (post) a Reed-Solomon decoder indicate the uncorrected and corrected errors. A before-Reed-Solomon decoder or pre-FEC BER value is the raw bit errors in the digital payload. Values lower than $1x10^{-5}$ are considered acceptable, with $1x10^{-9}$ representing a near perfect signal. The after-Reed-Solomon correction or post-FEC BER value is the BER after all corrections (improvements) have been made. This value should be numerically lower than the pre-FEC BER, with values lower than $1x10^{-6}$ considered acceptable. (Note: Lower values have larger negative exponents $1x10^{-7}$.)

Some analyzers include a segment error rate (SER) measurement. SER is the number of MPEG segment errors per second. A small SER value is desirable, with 3 (typically averaged over a 20-second window) occurring at TOV. Once segment errors start to occur, the SER value rapidly increases as the signal worsens.

Level dBmV

While level measurements of an 8-VSB RF signal are less important than the other digital measurements to ensuring reception, they are needed to ensure a sufficient level is being input to the receiver to be above its noise floor. It is also crucial in identifying excessive signal levels, which can overdrive the receiver's input circuitry. This results in mixing and noise products that can cause signal degradation and poor signal quality.

Measuring a digital channel's signal level is different from sampling the NTSC video carrier at peak power sync times since the 8-VSB signal has no high-power carrier, and the spectral energy is random. To measure RF channel level and determine a single value, the average level existing through the channel band must be determined. This requires the energy be sampled at multiple points throughout the band and averaged into a single dBmV level measurement.

Digital receivers can easily be overdriven, and input levels above +15dBmV should be avoided. Factors such as attenuators, improved antenna location, antenna gain, directivity, download cable size or preamplifiers can improve reception signal power. While reception is possible to levels approaching -30dBmV, all other aspects of the transmission path and

Figure 5. A spectrum analyzer shows the signal power as it is dispersed across the channel band. Variations from the ideal flatness of the signal level through the center of the band indicate frequency or phase distortions.

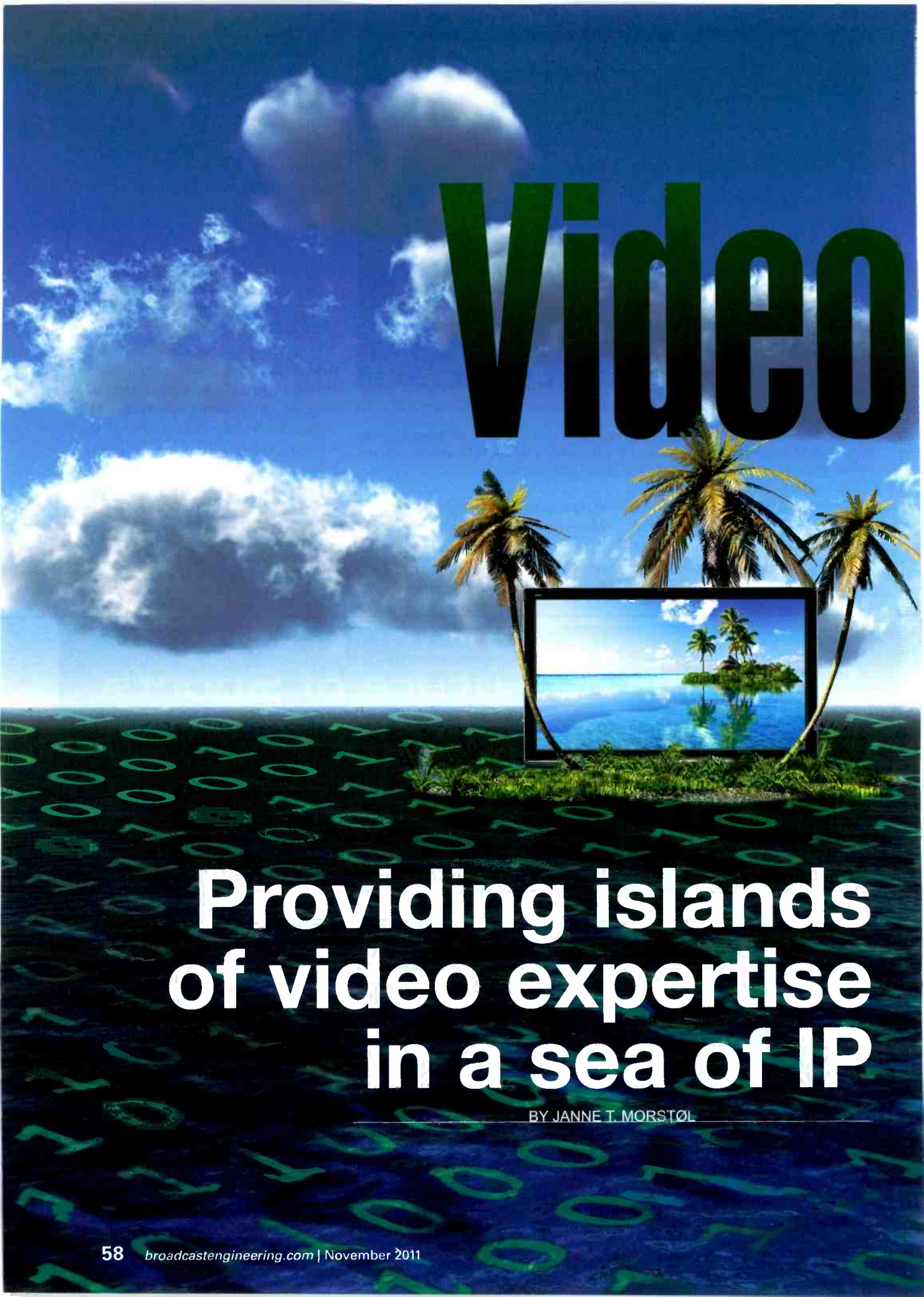
receiver's circuitry must be ideal. Improving reception levels to -20dBmV or greater reduces the chance of picture breakup when signal deterioration approaches the digital cliff.

Analyzing the digital channel spectrum

No 8-VSB RF analyzer would be complete without a spectrum analyzer to visually show the signal power as it is dispersed across the channel band. (See Figure 5.) Variations from the ideal flatness or even dispersion of signal energy through the center of the 5.4MHz channel band indicate influences of frequency and phase distortions. These variations may be transmitter- or transmission-path-related.

To conclude, a professional approach to answering 8-VSB broadcast-quality or reception coverage area questions is provided by the key 8-VSB analyzing tests summarized in this article. Routine field use and location monitoring provides RF performance information crucial to ensuring the health of the RF signal chain and ensuring reliable reception for viewers. BE

Glen Kropuenske is product manager in the Signal Quality Division at Sencore.



Video

Providing islands of video expertise in a sea of IP

BY JANNE T. MORSTØL

transport

All broadcasters and network operators need the flawless delivery of high-quality content to TVs and other video devices. More and more operators are achieving this through using IP in the core network and are starting to deploy IP at acquisition and at the studio. This article looks at how the move to IP brings advantages to broadcasters through important new techniques such as intelligent switching, advanced forward error correction (FEC), remultiplexing, monitoring and video compression. These techniques combine to not only make video transport more efficient but also provide important advantages in video network operations and workflow.

Even though the bandwidth advantages of moving to IP are so persuasive, the changes in workflows enabled by IP will be even more important moving forward. Many solutions now use two-way IP communications for enhanced control and management. The combination of the move to digital TV and the two-way nature of IP networks increasingly make it possible to build intelligence into the video network. This is a trend that's only just starting. The first steps have been taken with systems such as seamless redundancy switching, which is already making life a lot easier for a number of major operators. This trend will only increase, with IP providing a raft of advantages, including:

- Increased operational and workflow efficiencies;
- Maximized network bandwidth utilization;
- Minimized management resource requirements;
- Ensuring QoS throughout the video transport chain; and
- Improved cost effectiveness through redundancy and automation.

The initial criticism of IP in broadcast was that it was designed for data traffic and not for applications demanding very high quality, such as live HD video. However, these questions have now been pretty much resolved in the contribution and distribution domains, through engineering IP networks to fulfill the QoS requirements for live video and by deploying technology such as advanced FEC and Virtual Private LAN Service/Multiprotocol Label Switching (VPLS/MPLS).

The multi-device scenario

Today, broadcasters are faced with the challenge of delivering their content to a vast array of devices including large HD TV sets, SD TV sets, PCs, mobile phones and tablets. At the same time, whatever the viewing device, the customer expects a high-quality viewing experience. To meet the quality requirements demanded by consumers, the broadcaster has to deliver a product compatible with the highest video quality device, the large TV set in the living room. This means that the broadcaster has to design at least the first part of his content delivery network, the contribution network, to deliver high video quality. There is a clear trend toward broadcasters designing their contribution infrastructures to support 10-bit/1080p even though most of their current contribution is still SD or HD at 1080i or 720p. The transcoding to prepare the content for different viewing devices happens in the studio, allowing the quality and format to be tailored for the various device screens and resolutions and at the same time archiving the high-quality content for future repurposing. The use of IP networks makes it economically viable to keep the content at high quality for as long as possible throughout the video chain, which in turn makes transcoding more effective and efficient when handled centrally.

Looking at just one area, outside broadcast, IP connectivity in general has a much lower cost than previous satellite or video telco networks. IP also means that video can be distributed over generic Ethernet networks, rather than the whole distribution network being video- or broadcast-centric. This saves money and also makes it far easier to contribute content from wherever it is being generated, particularly for news footage or for sports and events at smaller venues that may not have dedicated links already installed.

JPEG 2000 in IP video transport

The JPEG 2000 codec is particularly suited for IP video transport. JPEG 2000 is a wavelet-based compression technology that provides a number of benefits over DCT compression methods such as MPEG-2 and H.264. JPEG 2000 has many inherent strengths and benefits that make it a better choice for high-quality video contribution. When run at bit rates from 120Mb/s to 200Mb/s, JPEG 2000 will deliver video quality comparable to uncompressed HD video, which otherwise requires bandwidths of 1.5Gb/s.

One major difference compared with the DCT compression of the MPEG family of codecs is that the wavelet transform of JPEG 2000 is carried out over the complete picture in one transform, and not by blocks of pixels. This avoids the MPEG macroblocking effect, which can create impairment easily noticed by the consumer.

DCT is well-suited to distribution because it was devised as a means of compressing broadband video to a small bit stream that could fit in narrow broadcast or satellite transmission channels. The MPEG family of video compression schemes can employ other tools, in addition to DCT, such as motion vector coding of image differences and entropy coding. Entropy coding can be compared to zipping a file. The computing power required for DCT processes increases significantly in proportion to the size of the image.

As an intraframe encoding method, JPEG 2000 encodes each video frame independently. This approach offers many benefits to live video contribution applications. Unlike DCT, JPEG 2000 produces very low latency of less than 1.5 frames for encode or decode. Since each video frame is a key frame containing all of its own picture information, the transport stream can also be edited with frame accuracy. JPEG 2000 can allocate 10 bits or even 12 bits at 4:4:4 quality — compared with MPEG-4's 10-bit/4:2:2 quality — a level in line with the demands of video contribution.

JPEG 2000 offers two compression modes. The mathematically lossless mode uses reversible integer wavelet filtering to ensure that the compressed data has all the information of uncompressed SDI video and therefore provides video transport of equal quality, but with a typical bandwidth saving of at least 60 percent. The visually lossless mode employs floating point filtering and quantization techniques to provide greater compression with no perceived loss of video quality. Typically, visually lossless JPEG 2000 uses from 120Mb/s to 150Mb/s, while the backhaul of uncompressed SDI video needs a 1.5Gb/s pipe.

The advantages of JPEG 2000 in contribution include:

- Low latency;
- Picture-by-picture encoding;
- Fewer visual artifacts;
- Robustness in case of transmission errors;
- Sustains multiple code/decode steps; and
- Two high-quality options, through support for both mathematically lossless (equal to uncompressed video) and visually lossless encoding.

IP robustness: meeting operator needs

A fundamental requirement for IP contribution networks is to flawlessly handle any single-point failures, both in the network and in the video processing devices. IP networks are typically designed with automatic and fast rerouting in the case of a node failure. The rerouting delays are highly dependent on the network design, but they can be as low as 50ms in a well-designed MPLS network.

A fundamental requirement for IP contribution networks is to flawlessly handle any single-point failures.

Several mechanisms can be employed to increase robustness in

the IP network. One mechanism is to use external redundancy technology, e.g. have video edge devices controlling external switches and thereby manage how content is sent through the network. Another mechanism is to have video edge devices more closely integrated with the IP network. A typical scenario sees cost-based routing mechanisms used to automatically select the best video signal where redundant video sources are available.

Of course, IP networks can still suffer from packet loss, so the video edge devices have to be able to cope with these losses and still deliver uninterrupted video signals. Advanced FEC mechanisms are now built into the video edge devices to ensure the reconstruction of any lost packets.

The market is moving toward building intelligence into the edge devices, thereby enhancing the robustness of the entire system. Cost-based routing mechanisms are already being integrated into video devices, but there is much more to come. Resource ReSerVation Protocol (RSVP) is a transport layer protocol designed to reserve resources across a network and is capable of improving both flexibility and robustness in contribution networks. Session Initiation Protocol (SIP) is widely used for controlling communication sessions such as voice and video calls over IP, and it is possible that this protocol will also find its way into professional video networks.

Networks can support automated redundancy switching with seamless switching between transport streams. Solutions are also available for SFN and DVB-T2 frame-aligned seamless switching for terrestrial networks. In addition, TS monitoring solutions are now available to handle multiple TS monitoring and error detection both over ASI and IP. These solutions deliver:

- Automatic input stream redundancy;
- Improved error resilience in IP networks, with advanced FEC; and
- Important QoS improvements for satellite network operators through automated traffic shaping designed to prevent bit-rate overflow in one service from affecting other services in the multiplex.

Providing video expertise in a sea of IP

It is clear that content distribution networks need to cater for more than just broadcasting content to the TV. As operators need to reach multiple device types as well as merging broadcast services with broadband content distribution, the flexibility of IP contribution networks will become even more important, with intelligent edge devices becoming a necessity as complexity increases.

The video industry is migrating to architectures that can be described as islands of video expertise in a sea of IP. This revolution is now unstoppable. JPEG 2000 compression, redundancy mechanisms and FEC, TS monitoring, and intelligent switching all combine to make IP-based video-centric networks more flexible, powerful and easier to manage.

We are already seeing large-scale deployments of systems designed to exploit video-centric IP networks. They are expected to deliver the highest possible quality, meet the most stringent QoS requirements, enable innovative workflows and result in cost-effective business practices for broadcasters and video professionals.

As IP becomes pervasive throughout the professional video world, continued innovation in IP video transport technologies will accelerate adoption and enable vendors with the crossover skill set of IP and video transport to ride the waves of change. BE

Janne T. Morstøl is chief operating officer at T-VIPS.

Avitech's Rainier-16U1V

Kiowa County Media Center selected the multiviewers for their compact size and ease of use.

JANET WEST

What do you do to help your community rebuild following a devastating tornado? It's a question several communities had to ask themselves this spring. Following an EF5 tornado in 2007 that obliterated 95 percent of the Greensburg, KS, county seat, the chair of the Kiowa County Media Center's board of directors, Janet West, decided that one of the keys to the future would be to build and establish the Kiowa County Media Center using state-of-the-art digital television technologies. The media center will serve to:

- Inform and serve residents;
- Support student-produced live Internet broadcasts of Kiowa County High School football and basketball games;
- Teach new career skills;
- Democratize city and county governments with live, interactive Internet broadcasts;
- Showcase innovative, environmentally sound rebirth;
- Support community-based journalism; and
- Provide a new Internet-based model for replication.

The Kiowa County Media Center's board of directors receives technical design and installation support from a Kansas State University team led by Bert Biles, executive producer for the Division of Communications and Marketing, and Brandon Utech, director of technical services at NILMT.

Major components of the media center include a 22ft HDTV production trailer to support live remote broadcasts and a permanent HDTV production studio in the LEED Platinum-certified Kiowa County Commons building.

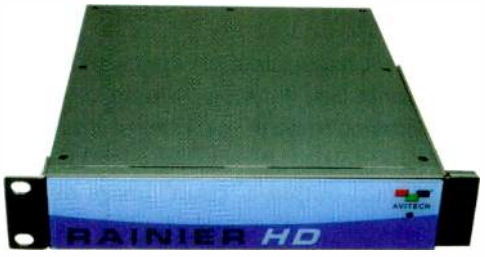
Both the trailer and the studio incorporate a pair of Avitech Rainier-16U1V multiviewers. The installers chose the multiviewers partly for their compact size. Conserving rack space was important in a trailer in which most of the equipment had to fit in two full-size racks. The team also chose the multiviewers for their ease of use. The crew members using the production trailer and the studio could be anyone from an experienced television producer or director to a high school volunteer, so the layout of the multiviewer system needed to be simple, yet flexible.

According to Biles, the multiviewer is a simple product understandable to even the most novice of users (once the concept of cascading inputs is explained). Additionally, the multiviewers' ability to automatically detect the format of the input signals simplified the installation. He added that the system's IP-based network allows users to customize the window layouts, colors and labels.

Utech observed that the layout-configuration presets that shipped with the multiviewers were useful because they provided detailed working examples of how the system could be configured and customized within the Galaxy control software.

The multiviewers will accept up to 16 HD-SDI video signals and one VGA signal. This enables the media center to display a variety of HD-SDI images from HD-SDI cameras and other sources, as well as display the control interface image from the NewTek TriCaster TCXD850, which is available as a VGA computer image. In the HDTV production trailer, the control interface image from the NewTek 3PLAY HD-SDI slow-motion instant replay unit — also a VGA computer image — is displayed on the second 46in monitor.

The installers also resolved another design challenge using the multiviewers: There was a separate room at the rear of the production trailer for the audio mix operator, and it was not



The Rainier-16U1V multiviewer accepts up to 16 HD-SDI video signals and one VGS signal.

physically possible for that person to see the two large 46in monitors the rest of the crew used at the front of the trailer.

The team simply took the DVI output from each of the two multiviewer systems, passed each of the signals through a DVI distribution amplifier and, while feeding one set of signals to the two front displays, fed the same set of signals to a smaller pair of 23in displays located behind and just above the audio mixing console at the rear of the trailer. Now the audio mix operator, while sitting in a different room and facing in the opposite direction from that of the director, can still see anything the director can see.

"[Center] visitors are surprised to learn that the Avitech Rainier-16-U1V multiviewer systems collect and present all 17 video images they see on each of the two 46in monitors [mounted on the front wall of the trailer]," said Grant Neuhold, center programming producer. BE

Janet West is president of the Kiowa County Media Center's board of directors.

Atomos' Ninja

Recording to ProRes avoids AVCHD hassles.

STEVE MULLEN

From the advent of cameras and camcorders that record video using long-GOP MPEG-2 and MPEG-4 (H.264/AVC) compression, there have been those who felt the need to bypass native MPEG compression. Their solution: small inexpensive devices that record ProRes or DNxHD to a hard disk or solid-state disk (SSD).

To achieve this goal, a camera or camcorder must have an HDMI port. The HDMI output must exactly match the sensor's frame size and aspect ratio. Moreover, the HDMI port must output a "clean" image during shooting. Absolutely no information can be overlaid. Unfortunately, many older cameras either cannot output a clean, correctly-sized image or cannot output video when shooting video.

Although an HDMI connection can carry 10-bit data, that does not mean your camera outputs 10-bit data. A camera can output 10-bit data, 8-bit data or place 8-bit data in the most significant bits of a 10-bit word. The latter option will provide only 256 distinct level changes — the same as carried by 8-bit data.

Frame rate is another issue to check carefully when choosing a recorder.

Recording 720p60 using ProRes LT, ProRes 422 and ProRes 422 HQ was simple and flawless.

Many cameras output nontraditional frame rates: 720p30.0, 720p60.0, 1080p30.0 and 1080i60.0. You need to be aware the Ninja will transfer these non-drop frame rates to ProRes files.

Some new cameras and camcorders record 1080p60, which the unit cannot record. Therefore, you will need to choose 1080i60 or a low-rate progressive rate that does not allow recording smooth motion. Other camcorders shoot progressive video but tag it as interlaced, for example, 1080i59.94/29.97PsF. Called progressive segmented frame (PsF), this video must be edited as progressive, not interlaced, video. To avoid time-consuming effort during post, you need the option to force ProRes files to be recorded as 1080p29.97. Unfortunately, the unit does not provide this option.

Enter the Ninja

Atomos supplied a Ninja to enable a test of recorder workflow. The unit ships in a tough, lightweight carrying case that includes most everything you'll need: a Ninja recorder built in an aircraft-grade aluminum chassis (900g fully loaded with batteries and disk), a pair of HDD/SSD disk caddies, a pair of 2600mAh batteries, a plug-in charger (for a pair of batteries), a docking station, a small power supply for optional use with the docking station, plus necessary cables.

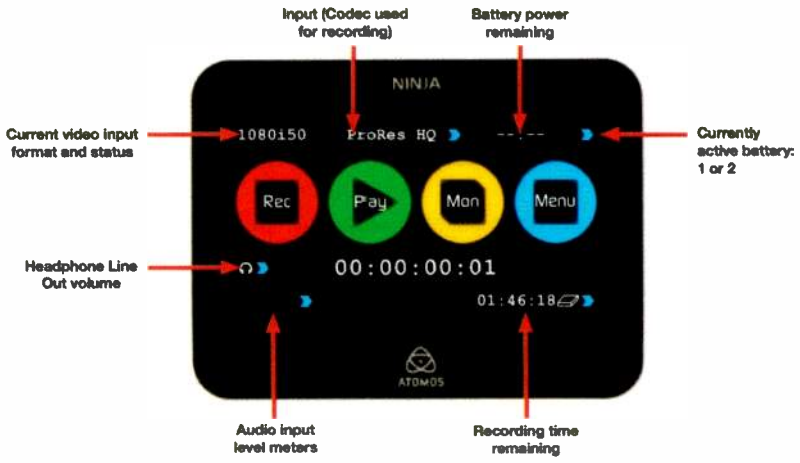


Figure 1. The Atomos Ninja display

It took me less than five minutes to mount a Hitachi Travelstar 500GB 7200rpm HDD in a caddy. After charging the batteries, I mounted them and then inserted the caddy. A mini-HDMI-to-HDMI cable connected my camera to the Ninja. After power-up, you'll see the initial display. (See Figure 1.)

Pressing the blue arrow above the recording time leads to a disk format option. Pressing the blue arrow next to recording codec enables you to toggle codecs: ProRes LT, ProRes 422 and ProRes 422 HQ. You can switch between the currently active battery by pressing the blue arrow next to the battery indicator. (Power is automatically switched from one to the other.) Headphone volume can be adjusted after pressing the blue arrow next to the headphone symbol.

A Ninja can record the two-channel audio feed from an HDMI cable. However, because many cameras and some camcorders have minimal audio capabilities, Ninja offers a 3.5mm stereo mini-jack for unbalanced line-level audio. (There is a similar jack for audio line-level output or headphones.) By pressing the blue arrow next to the clever audio level meters, you can select analog input (with an audio level control) and/or HDMI digital input.

Pressing Menu leads to a menu where you can make a number of

settings: time, initial time code, and choose to record time of day or time code. You can set the number of the current SCENE folder as well as the number of the current SHOT folder, which is placed in the current SCENE folder. Each recording file is automatically placed in a TAKE folder and then placed into the current SHOT folder. If you are thinking this nondefeatable Hollywood-style folder structure is overkill for a run-and-gun videographer, I agree. Particularly, because folders can't be named.

Pressing Record starts recording, although no video image is displayed. To monitor video while recording, you must press Monitor. You can now start and stop recording by pressing a small record/record-stop button. Although no auto-start/stop is provided via HDMI, there is a LANC input (and loop-though) that enables remote start and stop.

After pressing Play, you can choose — one at a time — a SCENE, SHOT and TAKE folder, and press play to review a single clip. There is no ability to delete a file or clear a folder.

Recording 720p60 using ProRes LT, ProRes 422 and ProRes 422 HQ was simple and flawless. After each test recording, I removed the caddy and slipped it into the beautifully constructed docking station. (See Figure 2.)

Back at the computer

A USB cable connected the station to an iMac (with Final Cut Studio and Media Composer) and a MacBook Pro (with FCP X). (I could have used a FireWire 800 cable. The station has a FireWire loop-through.) Pushing a caddy into the station automatically caused its hard disk to mount on the desktop.

I downloaded the user's manual and discovered FCP was the only NLE covered. Unfortunately, the instructions were incomplete. After issuing a File > Import... command, one must select a single SCENE folder to be imported into a Bin. (Every SCENE folder must be imported individually.) To complete the import, you must drag the SCENE folder into a Timeline. After selecting all Timeline clips, drag them back into a Bin. After deleting all Timeline clips, you can begin logging and trimming the clips in a Bin.

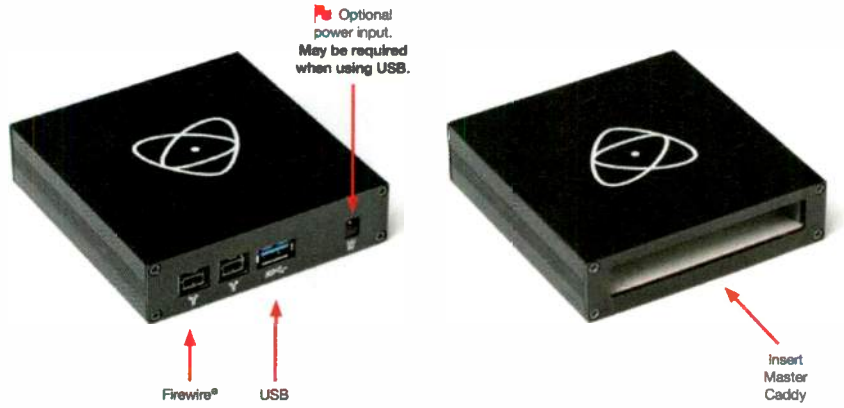


Figure 2. The Atomos Ninja docking station

I worked out the following procedure for use with Media Composer's AMA (Avid Media Access) capability. First, double-click AMA settings and enable Volume Management. Connect Ninja to your computer and issue the File > Link to AMA Volume... command. Choose the Ninja and browse to a SHOT folder. (Each SHOT and SCENE folder must be linked individually.) Select the folder and click Choose. The active Bin will receive a list of yellow marked clips. Yellow indicates the files are stored on the connected device.

For both FCP and Media Composer, all clip files remain on the disk and are "online" only as long as the disk is mounted in the docking station. Although you can edit clips from a mounted disk, when you want to reuse the disk, you'll need to transfer the files to your computer's hard disk. If you are using Media Composer with a Ninja (which unlike the Atomos Samurai does not support DNxHD recording), you'll use the Transcode command to import ProRes files and convert them to DNxHD. Because FCP supports ProRes, after selecting clips in a Bin, use FCP's Media Tool to copy the files from the Ninja to your Mac's hard disk.

Apple's new FCP X fully supports Ninja's folder structure. Simply import from the mounted Ninja, and all clips will be imported and organized into an Event that reflects a Ninja's SCENE and SHOT structure. You can immediately start editing using Ninja clips. In the background, ProRes, including ProRes LT, clips will automatically be copied to your computer's hard disk.

Conclusion

My workflow tests demonstrate the Ninja to be easy to use in the field. Working with an I-frame format avoids the performance issues with native AVCHD editing. Moreover, working with files on a Ninja avoids time wasted on importing AVCHD and transcoding to ProRes or DNxHD. While FCP editing is cumbersome, editing using Media Composer's AMA is fully supported, and editing with FCP X is a delight. BE

Steve Mullen is the owner of Digital Video Consulting.

Aviom's Pro64

NEP uses the audio network to develop custom solutions for broadcasting networks.

BY JOSEPH SIGNORINO

Several years ago, when NEP Broadcasting began its search for a new audio distribution system to replace its audio-over-fiber gear, the company discovered the Aviom Pro64 Series audio networking system. NEP provides teleproduction services for live sports and entertainment events, and it needed more up-to-date technology that could be counted on to withstand the harsh environments sometimes experienced when providing mobile broadcast facilities for sporting events such as racing, football and golf.

Temperature, humidity and rough handling are common challenges in the field, and the company needed a system that could perform under these conditions. The networked solution also had to feature built-in fiber interfaces, high-quality mic preamps, good signal-to-noise ratio and overall audio quality, along with ample headroom and scalability. Aviom was that solution and, with the Aviom Pro64 audio network, NEP has been developing custom solutions for leading broadcasting networks and organizations ever since.

From Aviom's very first demo for NEP, it was clear the company took client needs into consideration. In fact, when it first introduced the Pro64 technology as a potential fit, it didn't have a fiber solution. But, the company listened to concerns and quickly developed a component that integrated fiber optic connectivity. Aviom paid a lot of attention, and it was obvious it was serious about its products and backing up its system. From the CEO to the design engineers and the sales team, it provided on-site support until everything was dialed in.

In harsh environments like outdoor sporting events, the Aviom Pro64 series system allows production audio and effects audio mixers to have individual control within networks.

Audio on location

For complex applications such as racing events, NEP uses the networks to connect production trucks, talent and on-track mics. Using MH10f Merger Hubs, remote racks, the announcer booth, studio and production truck are all connected on site via fiber. Audio inputs are divided across independent sub-networks, and program audio and IFB can be integrated if desired.

At the heart of the remote racks is the 6416m Mic Input Module. These remote controllable mic preamps are placed at various locations around the track, field or location, along with an MH10f Merger Hub. The Merger Hub connects each remote rack to the production truck or trucks via fiber, allowing for long runs. In some cases, 6416o v.2 Output Modules are also placed in remote racks for audio out to talent ear pieces and the crew's intercom headsets, etc.

In production trucks, MH10f Merger Hubs provide a fiber interface to the remote racks. 6416o v.2s and 6416dio modules are used for analog or digital outputs to the console. RCI Remote Control Interfaces and MCS Mic Control Surfaces are used in the trucks to remotely control the 6416m units located in the remote racks. All gear within each rack is connected with Cat-5 interconnects.

Multiple points, more control

This setup, which can accommodate as many locations as needed, enables the ability to run multiple control points, allowing production audio and effects audio mixers to have control over their particular networks as audio is acquired and picked off from multiple points on the system.

In all, the network has been well-received by clients and audio engineers alike. The fact that the system is easily scalable makes it simple for NEP to go from events with relatively small systems, like football or golf events, to large systems for more complex events such as racing, where every piece of Aviom gear that NEP owns is combined. BE

Joseph Signorino is senior project engineer/mobile unit engineering manager for NEP Supershooters LP.

Streaming video

We have many codecs, but let's not forget quality.

BY JOHN LUFF

Streams and files are two key concepts that are inextricably intertwined with the technology we use in production and delivery of content. Files are defined by their start and end. By definition, a stream is "not bounded," though in practice we use the terminology in ways that muddy that distinction. When a file is received, one may know from the wrapper, though not necessarily, its precise size, and from the metadata inside, the length of its essence. We don't think of baseband (digital) video as a stream, but it fits the classical definition. One can enter a SMPTE 292 HD-SDI stream at any frame boundary and continue to decode until the stream ends. But one has no idea how long the stream will continue in most cases.

Similarly, one could enter an MPEG stream by finding the program map table (PMT) and following the chain to decode the essence, but one may still not know when the stream will end. But we can "stream" a file, meaning a bounded content item can be played out as a stream of content, and in fact, in common usage we more often think of stream to mean this specific instance. It would be silly to argue we need to change the lexicon at this point (though I wish we could).

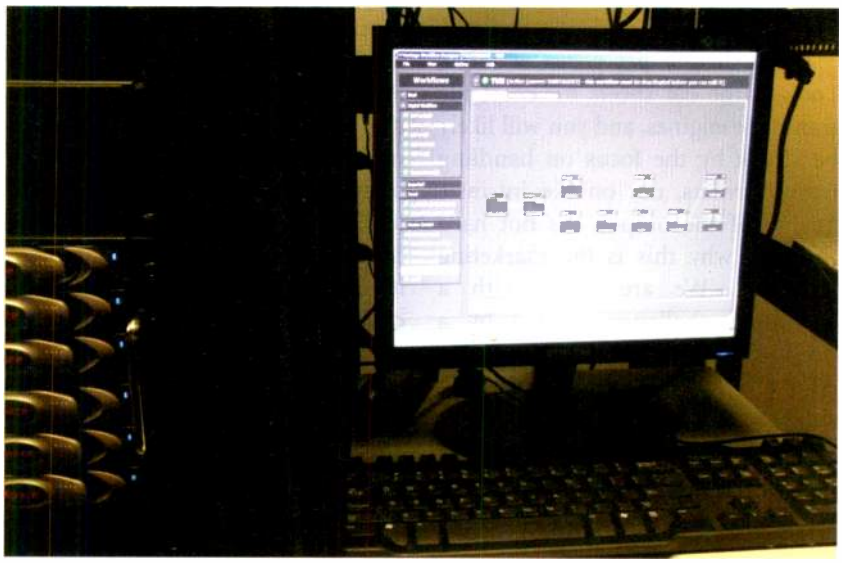
My point in making this distinction is that we need to be careful how we use technical terms to describe what we are doing. In the broadcast realm, we create files that are later streamed, at least for the most part. So the details of streaming video are more commonly dealt with by us as creating files suitable for streaming. To be sure, there are live events that we stream in the etymologically correct sense, but repurposing content into files able to be streamed is more generally the technology question we face.

Formats

Charlie Jablonski, ex-NBC executive and SMPTE past president, has said that NBC never met a format it didn't like. As an industry, we appear perilously close to that paradigm when talking about streaming formats. That is in no small measure driven by the proliferation of consumer delivery platforms and technologies. Ultimately, broadcasters do not have control of the final delivery pipes to the home. Who would want to?! Managing a global distribution system for content associated with your station's website would require expertise outside that of broadcast engineers and could trap financial resources that would be better applied to content creation and management. As a result, everyone buys service from providers that are happy to have that responsibility, and profit.

So we have to find ways to cost-effectively manage a proliferation of delivery formats. It would be nice if this were easily solvable. It is not, in part because it is not a stable ecosystem. New consumer delivery options pop up every year. Some operators on the Web choose to solve the problem by embedding a YouTube player and not hosting at all. But broadcasters want to deliver to mobile phones (many types), ATSC-M/H, VOD files on cable, and hosted sites for content like YouTube, Hulu and many other options. That requires knowing the details of those delivery specifications so content can be efficiently created and pushed out knowing with certainty that the consumer will have access that works the first time and every time. Consumers will quickly stop trying to watch your content after at most a few unsuccessful attempts.

All of this is new knowledge for old engineers, though younger, and perhaps more computer-savvy, techies seem to take to it more quickly. I do think, however, that a simplistic view of content as just mathematical



At its Temecula, CA, network operations center, Outdoor Channel uses Telestream Vantage to improve the speed and efficiency of transcoding and delivering content for multiple destinations.

transformations of existing files is dangerous to our long-term progress as an industry. We are losing sight of the reason we do this, which I am still convinced is to supply compelling, enlightening and high-quality content to consumers. So I interpret our responsibility as technologists as a requirement that we understand what quality is and find the best tools possible to make the content accessible in the highest quality we can achieve.

Many blades, but are they sharp?

I will share a pet peeve of mine. Look at the cut sheets for most file transcode engines, and you will likely be struck by the focus on handling many formats, not on the intrinsic quality of the output. It's not hard to grasp why this is the marketing approach. We are faced with a mounting challenge created by a multiplicity of formats that must be supported. It would be nice if a single tool could solve all problems, like a Swiss Army knife. Marketing that way gets our attention. In fact, it draws it away from the desire to do quality work, which might be at the expense of speed and simplicity of workflow. We are all pressed for time, and we are offered a daunting array of choices to build the transcode workflow we need to make delivery of this multistream world possible. If we can solve the problem easily with the Swiss knife, we might try it.

But the fact is that each of the transcode tools we find has strong and weak points in their arsenals. That, of course, leads to specialized tool choices for some stream delivery applications. In past eras in our technological life, we sometimes chose to use companies that offered specialized services to solve particularly thorny problems with proprietary hardware (and software) systems. For instance, at one time, transferring video to film could be done at moderate quality with hardware you bought at high cost, or it could be jobbed out to a company like Image Transform that provided high quality at moderate cost, and without capital investment.

Today, we are offered systems "in the cloud," service offerings that will receive content and transform it to any output format. This has no capital cost, no ongoing labor for maintenance and should allow the provider to incrementally improve the output quality by spreading fixed costs across a wide array of customers. Even better, it allows them to pick the best tools, taking into account both quality and efficiency of operation and workflow. Where appropriate, a supplier can invest in custom development to fill a niche it perceives as not well-served by competitors. Such custom development is out of the question for most, though not all, broadcasters.

If we can refocus our energy on delivery of quality instead of everyone looking at every possible tool for each possible transcode, we might find a new paradigm has taken shape in our industry. I have high hopes that the workflow and quality challenge will be solved by the inclusion of services and the implementation of SOA-based tools, like those envisioned by the AMWA and EBU in their Framework for Interoperable Media Service (FIMS) project, which has garnered a lot of attention lately. This engineer hopes they are successful at developing cost-effective and powerful tools that get broadly adopted. BE

John Luff is a television technology consultant.

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

Wohler — RMQ-230

Quad-split video monitor allows users to watch video and monitor data in up to four display windows on a single 23in 1920 x 1080 LED backlight screen; accepts 3G/HD/SD-SDI, analog composite and HDMI inputs in varying configurations tailored for different monitoring applications; allows broadcasters to mix and match video input formats on a single screen; can display waveform and vectorscope screens while also providing audio de-embedding, audio metering of up to eight channels, UMD, timecode and various markers.

www.wohler.com

Larcan — MXi

Series of low-power transmitters is available from 5W to 1kW digital and beyond; designed to address the needs of emerging digital and mobile markets and single-frequency networks worldwide; features a touch-sensitive LCD display engineered to monitor and report all operating parameters; capable of all standards in analog and digital ATSC, DVB and DVB-H.

www.larcan.com

Hamlet — Vidscope-Plus

Test and measurement tool analyzes all aspects of audio and video either as a file or — with a suitable video capture card — as real-time content; allows up to six concurrent traces to be displayed on a single monitor; covers all standard parameters, including video levels, color gamut, histograms, waveforms and vectors, together with audio levels and phasing for stereo and 5.1 surround sound; checks for flashing sequences.

www.hamlet.co.uk

FOR-A — SmartStudio

On-air graphics system provides real-time character generation, clip recording and picture-in-picture capability within a single unit; suited for use in live event production, studio production and web-casting; powered by FOR-A's MBP-1244 video platform, which delivers 4:4:4:4 RGB signal processing and an improved PC-based, real-time graphics system; video I/O board supports one HD-SDI (1080i) or SD camera and three additional video sources.

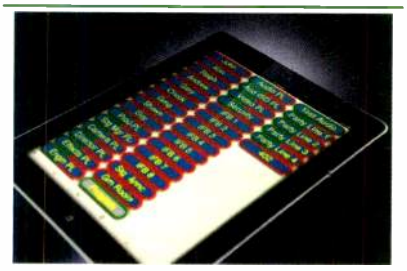
www.for-a.com

Snell — ICE Version 2.2

Integrated Content Engine (ICE) combines a video server, graphics, switchers, channel branding, captioning and subtitling in a 3RU package managed by Morpheus automation; version 2.2 introduces additional branding tools for visually enhancing HD and/or SD channels, as well as customized VANC insertion for channel-in-a-box playout systems; gives operators the ability to generate vertical and horizontal crawls via automated URL or RSS feed from manually created source information.

www.snellgroup.com

RTS — VLink Mobile



Option offers fully interconnected, DHCP-compliant virtual communications for RTS intercom systems; available in basic and premium versions; features include unlimited access, flexible configuration, full integration into RTS matrix intercom systems, SIP support and mobility; compatible with Mac and PC; optimized for use with mobile devices.

www.rtsintercoms.com

ikan — PT2500

Combines a portable through-the-glass telemprompter and rod-based camera support system; designed to accommodate small- to mid-size cameras; uses high-quality 30/70 prompter glass; includes ikan's PrompterPro 3.0 teleprompting software for optimal control; features an 8in LCD monitor and an Elements 15mm rod-based system; is lightweight, adjustable and easy to set up in the field.

www.ikancorp.com

NTP Technology — PENTA 725 IP

Enables audio routing over IP-based GigE with linear PCM audio quality and sub-millisecond latency; housed in a 1RU-high 19in chassis; has a capacity of 1024 x 1024 crosspoints; can accommodate 64 bi-directional channels via IP; can be populated to handle 64 AES3 input/output channels, six optical MADI channels and optional sampling-rate converter interfaces; two RJ45 Cat 6 GigE connectors are available on the router for fully redundant connection.

www.ntp.dk

Camera Corps — Q-Ball Pre-Set

Remotely controlled HD/SD camera head can store up to 18 preset pan, tilt, zoom and focus positions when used with the company's PTZF switcher and joystick control unit; is identical in size and shape to the standard Q-Ball but can be switched rapidly from one preset configuration to another; settings are stored to non-volatile memory inside the head so they are retained even after a system is powered down.

www.cameracorps.co.uk

ViewCast — Niagara SCS 6.4

New version of streaming media software includes support for live encoding via Microsoft Live IIS Smooth Streaming and PlayReady DRM, updates to Akamai HD iPhone and iPad streaming, improved MPEG-4 streaming, and presentation and security enhancements for the entire adaptive streaming portfolio; at the heart of the system is the Adapative Live Media Publisher component, which simultaneously creates multiple H.264 video streams that are time-aligned to support delivery in adaptive formats.

www.viewcast.com

Calrec Audio — Artemis Light

Audio console is part of the Artemis family of Bluefin2/Hydra2 audio consoles; incorporates Bluefin2 High Density Signal Processing and networking technologies in the same control surface used by Artemis Shine and Beam; can be fully integrated with any existing Hydra2 network; has 8 x Hydra2 ports for interfacing with the Hydra2 I/O range, as well as other Hydra2 routers and their I/O; supports point to multipoint routing, the Calrec H2O router control GUI, and third-party remote-control protocols SW-P-08 and EMBER.

www.calrec.com

Trilithic — EASyCAP

Next-generation Emergency Alert System (EAS) solution is designed to give cable, IPTV and broadcast systems what is necessary to comply with the new Common Alerting Protocol (CAP) guidelines, as well as deliver emergency alerts from the Integrated Public Alert and Warning System; receives all of the required EAS alert messages, including local access messages for franchise agreements, and controls all of the network devices necessary to deliver the messages to system subscribers.

www.trililthic.com

TV One — 1T-CT-670

Extends deep color (12 bits) v1.3 HDMI with HDCP signals at resolutions up to 1080p to display devices at distances of more than 3000ft using a single fiber-optic cable; components include the 1T-CT- 671 transmitter and the 1T-CT-672 receiver; system can also be used to transmit embedded lossless audio and encrypted, audio-based, graphics data; products also feature task-locking power connectors to enhance overall system security.

www.tvone.com

Weather Central — Forecast Tailor

Web app ensures that broadcasters have the same forecast on every screen; eliminates the repetition and potential inconsistency inherent in pushing weather content simultaneously to websites, mobile platforms and other display devices by automatically populating templates for each target with information drawn from any Weather Centeral broadcast production system.

www.wxc.com

Sonnet Technologies — DiOPro

Incorporates one slot each for CompactFlash (CF), SDXC and SDHC memory cards; allows for high-speed data transfer from professional memory cards; features 5Gb/s SuperSpeed USB 3.0 interface and is backward-compatible with USB 2.0; compatible with Mac Pro and MacBook Pro computers using a Sonnet Mac OS X-compatible USB 3.0 adapter.

www.sonnettech.com

Broadcast Pix — Mica

Live video production system leverages native HD technology found on the company's Granite systems and Broadcast Pix Fluent software, which integrates video and file-based content; includes a multidefinition switcher that can mix eight HD/SD-SDI inputs and seven channels of internal clips, animations and graphics; supports up to six keyers and DVEs, six HD/SD-SDI outputs and two DVI outputs; features a 30-hour clip store and a Harris or optional Chyron character generator; housed in a single 4RU case.

www.broadcastpix.com

Small Tree — ST 10G24 SFP

10Gb switch is optimized for video editing; offers low latency, jumbo frames, symmetric flow control, link aggregation and full Spanning Tree Protocol support; enables multimode or single-mode fiber media configuration and connectivity to 10GigE or 1GigE networks via SFP+ or SFP connectors in addition to providing advanced features such as Layer 2 switching, IP v4/v6 routing, QoS and management capabilities.

www.small-tree.com

Clear-Com — Concert for Newsroom

Allows users of newsroom applications to communicate with each other and simultaneously initiate a call and/or chat; allows for conferencing while participants are working in stories; can interface with external audio systems, including partyline systems, paging systems, and program feeds; program feeds can be interrupted by important communications from the news director or producer; compatible with Windows 7 and XP.

www.clearcom.com

Radio Frequency Systems — PeakPower+

PeakPower+ bandpass filters now include a range of eight-pole models; the five eight-pole filters complement the five six-pole filters for a total of 10 PeakPower+ models; both the eight-pole and six-pole models are available in 500W, 1kW, 2.5kW, 5kW and 10kW variants; the eight-pole range offers a high power rating and low insertions loss; eight-pole range is tunable over the full UHF frequency band and supports adjustable bandwidth across the 6MHz, 7MHz and 8MHz channels for global applications.

www.rfsworld.com

Blackmagic Design — DaVinci Resolve 8.1

New software update can be downloaded free from the company website by all DaVinci Resolve customers; includes support for Apple Final Cut Pro X XML round trip, new layer node composite effects, ACES colorspace support, compatibility with Avid AAF for round trip with Avid Media Composer, Final Cut Pro 7 clip size and position support, new copy commands for grades, upgraded EDL features, support for UltraStudio 3D for Thunderbolt, and compatibility with the 2011 MacBook Pro 15in computer.

www.blackmagic-design.com

Employment

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Employment

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Broadcast Engineering, November 2011, Vol. 53, No. 11 (ISSN 0007-1994) is published monthly and mailed free to qualified persons by Penton Media, Inc. 9800 Metcalf Ave., Overland Park, KS 66212-2216. Periodicals postage paid at Shawnee Mission, KS, and additional mailing offices. Canadian Post Publications Mail Agreement No. 40612608. Canada return address: Bleuchip International, P.O. Box 25542, London, ON N6C 6B2. POSTMASTER: Send address changes to Broadcast Engineering, P.O. Box 2100, Skokie, IL 60076-7800 USA. CORRESPONDENCE: Editorial and Advertising: 9800 Metcalf, Overland Park, KS 66212-2216 Phone: 913-341-1300; Edit. fax: 913-967-1905. Advert. fax: 913-967-1904.

3-D TV mid-term progress

Is interest still high for 3-D, or is it again a fading fad?

BY ANTHONY R. GARGANO

Have you noticed the abatement in hype surrounding 3-D TV? The question cries out: What has happened to last year's declared "breakthrough technology of the year?" That such a declaration was made at the Consumer Electronics Show is no surprise, for who but consumer electronics manufacturers stand to gain most by hyping 3-D as the latest and greatest living room must have?

In a study by Retrevo, it found the average price premium for a 3-D TV receiver over a standard 47in-50in HDTV receiver, which once stood at just over $900 in July of 2010, had decreased to $400 by July 2011. Despite the narrowing of that price premium, set sales still are lackluster. The study also projected that, by this year's holiday shopping season, price premiums would be down to just $150-$200. So, set manufacturers are hopeful a minimal price premium will attract more consumer interest in 3-D. An emerging new sales strategy now is to promote 3-D as a feature of an HDTV set, much like sets being marketed as Internet-ready.

Perhaps the lack of consumer interest in 3-D TV sets for homes is not a pricing function at all. It just may be that 3-D is again fading. The movie theater environment, where ticket purchasers have essentially committed to spending a couple of captive hours, is the ideal setting for 3-D viewing. But, even here, interest is waning.

With each 3-D fad reincarnation, a new generation of viewers is introduced to it by a Hollywood forever looking to enhance box office receipts. Several years ago, Hollywood created the current 3-D wave as a way to enhance revenue, and, at its peak in 2010, theaters charged as much as a 25-percent premium over standard 2D ticket prices.

Since then, however, despite more than twice as many 3-D releases in 2011 versus 2010, box office admissions through Labor Day weekend were down 5.1 percent, and box office revenue down 4.3 percent compared to the same period in 2010. The ticket price premium today for the 3-D version of a movie is now as little as a dollar. The public's latest fascination with 3-D seems to have peaked in 2009 with "Avatar," when 3-D ticket sales accounted for a whopping 85 percent of its total gross. In 2011, in the latest release of the successful "Pirates of the Caribbean" franchise, 3-D ticket sales accounted for only 47 percent.

Why is the CE industry trying to sustain life in the gasping canary of Hollywood's 3-D coal mine?

On the television side, ESPN 3D launched with great fanfare in June 2010, but appears to be on the verge of dying. It continues to broadcast with virtually no viewership only because it still has ad revenue. Who are the sponsors? If you said consumer electronics manufacturers that are trying to hype 3-D set sales, well done.

In a September interview with the *New York Post*, TVPredictions.com publisher Philip Swann said he believes 3-D has scared and confused consumers — and is now tanking the entire retail television marketplace. Swann also predicts display manufacturers will give up on advertising on ESPN 3D, at which point it will go dark.

Forward-thinking Mark Cuban, who started up the 24-hour, all HD channel HDNet when there was virtually no HD, put it pretty succinctly when he said, "3-D on TV is a bust."

Also owner of the Dallas Mavericks, Cuban's insight went deeper.

"On the Mavs' run to an NBA championship," Cuban said, "despite me always throwing stuff at the 3-D cameras and having fun with them, not a single person mentioned the 3-D broadcast to me."

The Nielsen Company, in its recent "State of the Media: The Cross Platform Report," said two-thirds of television households now have HDTV sets. So, with households without HDTVs approaching 40 million, there is still a huge remaining addressable market for HDTV. Clearly, penetration will never be at 100 percent. But, add to that the second set and replacement market for existing HD households, and that defines a market still in the tens of billions of dollars.

So, why is the CE industry trying to sustain life in the gasping canary of Hollywood's 3-D coal mine?

The CE industry should be advertising on *your* TV station for that multibillion dollar HDTV market. It is an opportunity to be leveraged, while another run at 3-D, consumer-be-damned, we know will come. BE

Anthony R. Gargano is a consultant and former industry executive.

? Send questions and comments to: anthony.gargano@penton.com

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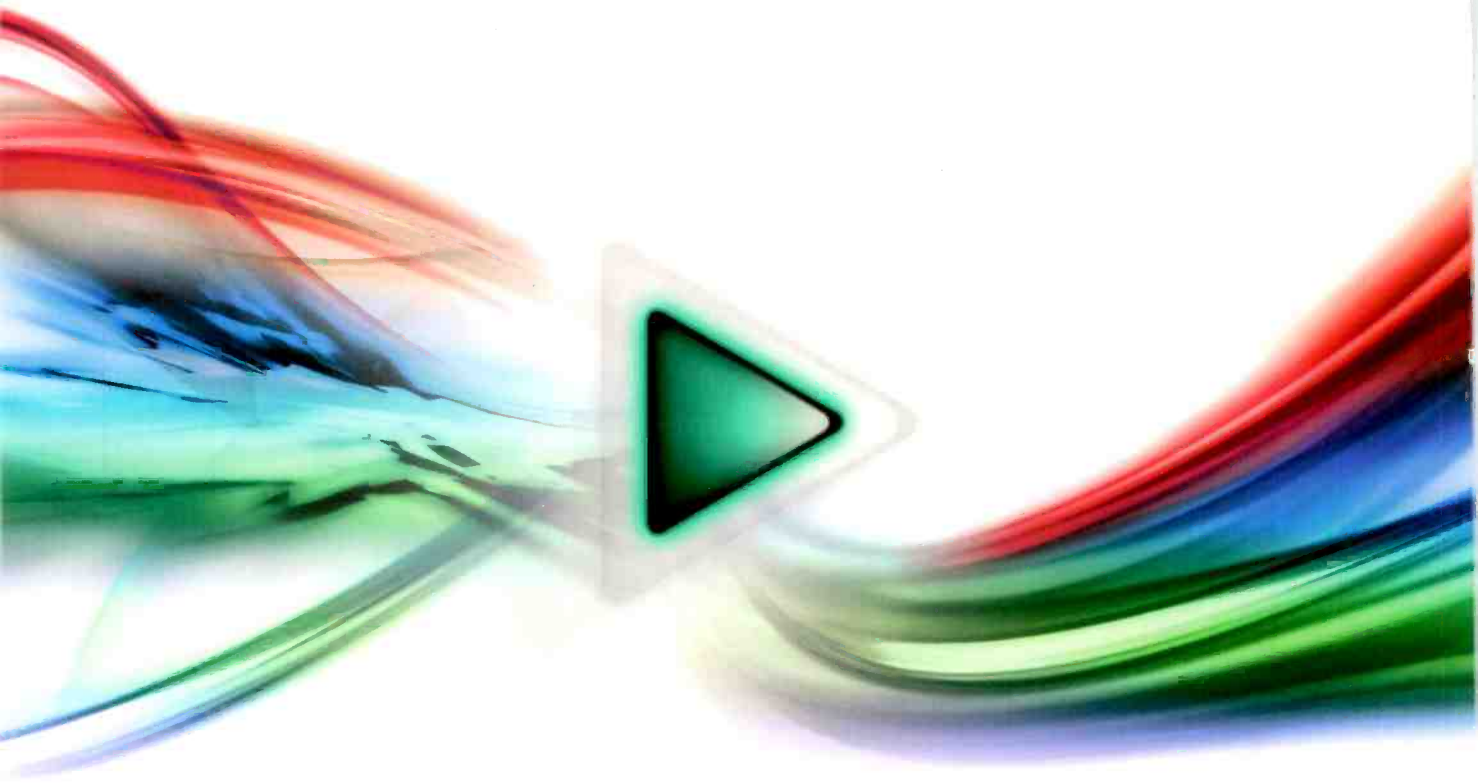

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