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WHAT'S INSIDE





# Skype Duo Unveils Joost

## Venture aims to deliver TV-quality P2P video

by Mark R. Smith

NEW YORK

The creators of Skype, the broadband phone service, are bringing a new way to distribute high-quality video content for P2P (peer-to-peer) users to market.

What was created as The Venice Project by Niklas Zennström and Janus Friis has reached the beta stage as Joost. It is slated to become available to consumers by mid-year and integrates existing "best-of-breed technology into one platform," according to CEO Fredrik de Wahl.

### REPLICATING THE TV EXPERIENCE

What makes the new service go is Skype's global indexing software to facilitate P2P delivery, Mozilla framework for the clients, a CoreCodec and other technology used with the SVG (an open standards-based imaging format that complies with the World Wide Web Consortium) user interface in a secure, piracy-proof environment.

Incorporating existing technology "gives us a competitive advantage and makes getting to market faster and easier," de Wahl said.

But the user experience is not technology driven, according to de Wahl.

"Joost is about easy to use, replicating the TV experience and bringing it to the Internet," he said. "It has no Web browser or interface—users get content on a channel on a full TV screen. They can watch what they want, when they want it, from wherever they are."

Posting content is free on the service, compliant with the Digital Millennium Copyright Act, which signs legal agreements with owners before it appears on the site.

Revenue creation will be though advertising, with Joost earning its percentage depending on whether the service or the content owner sells it.

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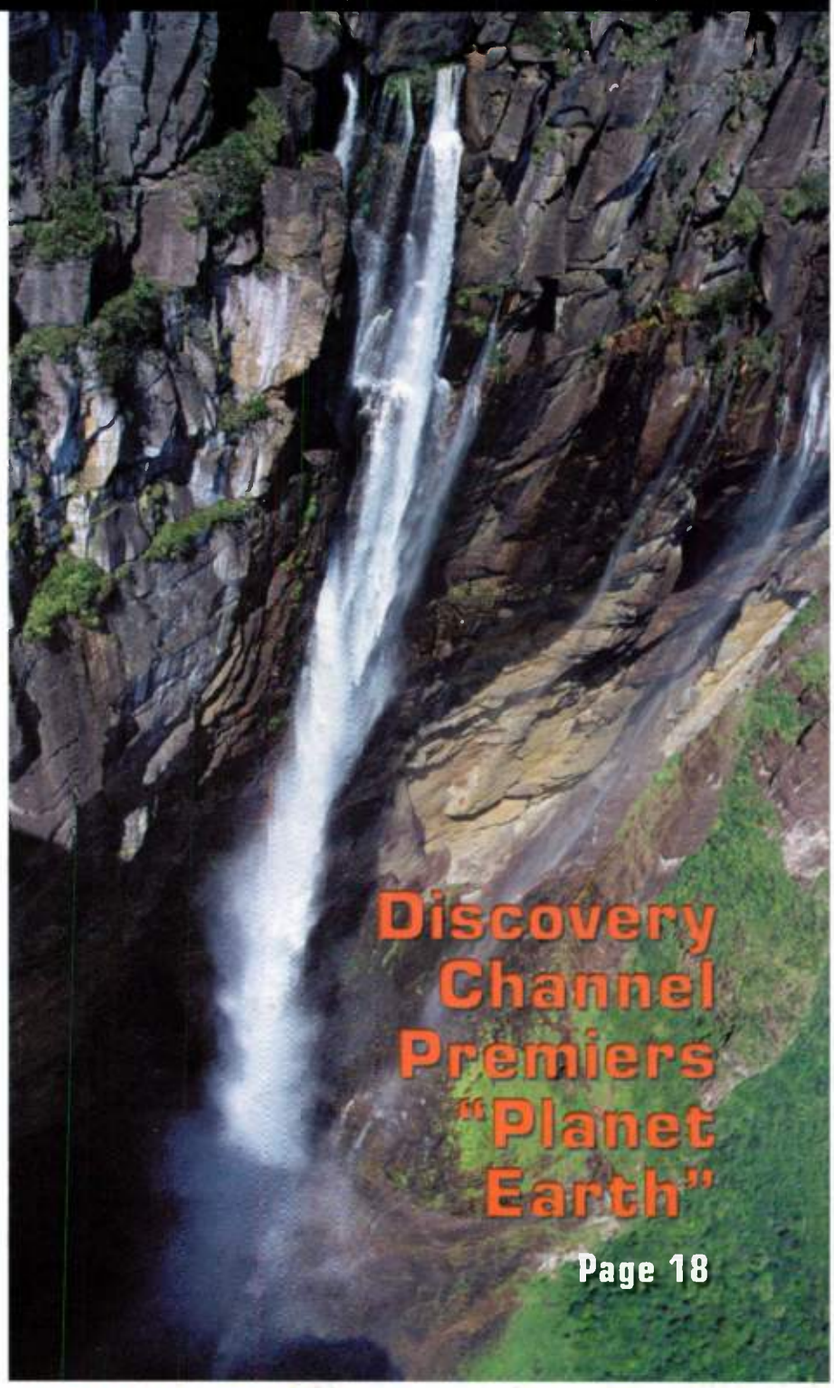


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**Panasonic ideas for life**

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## NEWS



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## EQUIPMENT



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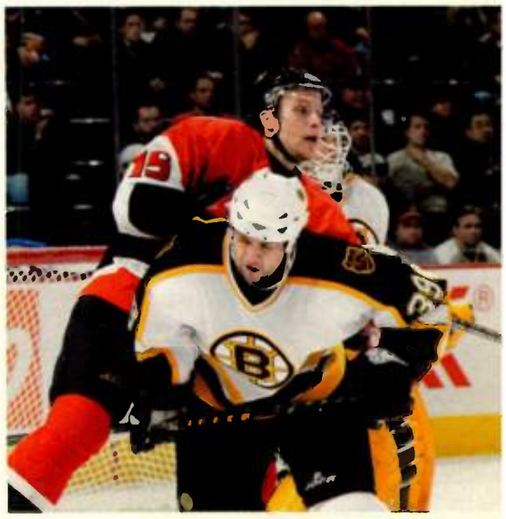
NHL streamlines TV coverage



*On the cover: Angel Falls, the world's highest waterfall, is captured by the Cineflex Heligimbal.*

### CONTRIBUTING WRITERS

Charles W. Rhodes

Digital TV

The IEEE Consumer Electronics Society celebrated its 75th anniversary at the International Conference on Consumer Electronics in January, along with the Consumer Electronics Show in Las Vegas. I presented two technical papers: "New Challenges... p. 38

Mary Gruszka

Audio By Design

As you continue your search for the surround sound console of your dreams, here's one more item to add to your checklist—panning. Surround panning that is. If you're familiar with stereo consoles, you know that you can pan a channel hard left... p. 49

Craig Johnston

Production Manager

I was taught a long time ago, in managing employees at a business (or your own children at home), that if you have to resort to "because I said so," you might get your way, but you've lost the argument. A recent Newsweek interview with Jonathan... p. 53

## FROM THE EDITOR

# Sometimes It IS About the Picture

All too often, during the transition to digital television, cynics and naysayers have been too quick to dismiss HDTV as "just the same garbage but with clearer pictures." And yes, while that may be true for a lot of primetime network television, some productions have raised the bar and demonstrated to viewers why they bought that giant flat panel set after all.

Next month, Discovery HD, in conjunction with the BBC, will premiere "Planet Earth," an ambitious multi-part series that promises to showcase some of the most stunning nature footage ever captured. Five years in the making, the programs illustrate what can result when you combine advanced lenses and compact cameras with aerial technologies.

Using a device called the Cineflex Heligimbal, "Planet Earth" production crews were able to capture video of wildlife that could not be obtained in the past. "Some of these sequences would never have been captured had we not been [shooting] from so far away and had our presence been known by the wildlife," said Huw Cordey, producer of the series, in our report, starting on p. 18. Adds Maureen Lemire, executive series producer, "Some people may have become a bit jaded with HD over the years, but viewing a lot of these scenes will change that."

Discovery Channel founder John Hendricks made the decision to produce "Planet Earth" in HD more than five years ago, when there were more HD doubters than there were sets in American homes. Now, it appears that his vision has been confirmed. Along with "Sunrise Earth," a daily ritual in many homes, Discovery HD is bringing a window into the world of nature that only HDTV can truly reveal.

Tom Butts
Editor
*tbutts@imaspub.com*

# LETTERS

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

## Remembering Ron

***Dear Randy Hoffner:***

I wanted to thank you for your tribute to Ron ("Remembering TV Stereo Pioneer Ron Estes," Dec. 6). Yes, he was a true pioneer in our industry, and even more than that, one of the nicest guys you could ever meet. He was always willing to share his vast knowledge with anyone without pretense or ego. I don't think it was part of his nature to realize how many people actually looked up to him.

Recently, a young student from Full Sail in Orlando, Fla., spent some time with me in our remote truck. We were setting up our Fox Sports NFL game in Tampa, and besides obvious technical questions, he asked me who I looked up to in the industry. He named a couple of the current crop of hip-hop record producers and was surprised when I said "No, the people I looked up to were Ron Estes and Bob Siderman." Both are gone, both were innovators and friends that will be dearly missed.

***Pat Lucatorto***
***Buckeye, Ariz.***

## Gear Wars

***Dear Andy Ciddor:***

Thank you for saying what needs to be said from time to time, ("Passions Aside, It's About the Lighting, Dec. 6).

But it's not just about "lighting" alone. Substitute sound for lighting and microphone for lighting instrument and your comments still apply.

Far too often, we get caught up in the gear wars (akin to locker room braggadocio), and overlook the job at hand. Sure, having all the modern high-tech tools would make the creation of the Taj Mahal easier but without the vision, one may as well have just a stone ax.

***Rick Crampton***
***Northport, Maine***

## Light and Shadow

***Dear Andy Ciddor:***

Regarding your Dec. 6 column, as a video engineer, the most important tool I have is the lighting director/gaffer. It doesn't matter how good the camera is if the light isn't right. A good LD/gaffer can make an average camera make spectacular pictures, but a good camera won't compensate for an unimaginative LD.

One of the most interesting shoots I've done (over the past 25 years or so) was a tabletop product shot where the gaffer used a single overhead source and probably 20 or 25 little bounces of various types: showcard, mirrors, foil, etc. It was so cool to watch him work!

***Randy Horenstein***
***Senior Production Engineer***
***Crawford Communications Inc.***
***Atlanta***

***Andy replies:***

First, let me say how great it is to hear a video engineer say that they care about the quality of the lighting. Far too many of the video engineers that I've worked with were only interested in a constant color temperature and a constant exposure, so that they could sit at the console, read their book or carve their balsa wood model, and not actually participate in the production. I'm very passionate about my pictures and it's pleasing to hear that others are too!

I like your story of the gaffer and the product shot. It illustrates the point that lighting is all about light and shadow, and not necessarily about the prestige associated with the cool (or otherwise) tools that we use. Your gaffer sounds like a true craftsman in light, as well as being a technical professional who had been around the block a few times. When it comes to product shots, trying to use too many fixtures and complex grippery often creates a gridlock of gear around the setup that may eventually cause more problems than it solves.

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## NHK Exec to Keynote at NAB2007

**WASHINGTON**

Hirokazu Nishiyama, managing director of Japanese public broadcaster NHK, will keynote the 61st annual Broadcast Engineering Conference at NAB2007 in Las Vegas on April 15. The conference provides a forum for engineers to discuss technology's impact on future trends in the broadcast industry.

*Hirokaza Nishiyama*

Nishiyama will focus on mobile, HDTV, IPTV and VOD and the opportunities these advanced services create for broadcasters. He also plans to discuss the various applications that make Ultra-HDTV—which was shown at NAB2006—a promising technology for the future.

Nishiyama currently oversees all engineering activities and supervises NHK's Engineering Administration Department and the Science & Technical Research Laboratories.

Pre-viously, he served as associate director of the Engineering Administration Department, where he was responsible for developing broadcasting equipment for HDTV; and as executive deputy president of NHK Enterprises America Inc., where he played a major role in production of HD programs in the United States.

NAB2007

## WUSA Streams Hi-Def SOTU Over IP

**WASHINGTON**

Washington, D.C. CBS affiliate WUSA marked a first with the high-definition Web streaming of President Bush's Jan. 23 State of the Union Address.

The event was the first public streaming of a live event in HD, according Digital Rapids, the Markham, Ontario company that provided the encoders used for the project.

A high-definition pool feed was used by WUSA as the source for the Web simulcast.

The station used two Digital Rapids' StreamZHD encoders, along with Digital Rapids software to provide real-time delivery of 1280 x 720 video.

"Having proven ourselves as a leader in both HD television news and leveraging streaming video for local news on the Web, bringing the two technologies together is a logical step in delivering the best possible viewing experience to our audience," said Brian Franco of WUSA, a Gannett Co. station. "Digital Rapids StreamZHD was uniquely well-suited to high-definition streaming, and the encoders performed flawlessly. We intend to make as much HD content as possible available through our Web site, and StreamZHD provides us with the technical capabilities to efficiently achieve this goal."

The StreamZHD includes motion-adaptive de-interlacing and 3D motion-adaptive noise reduction.

WUSA is recognized for other pioneering accomplishments in high definition television. It was the first station in the Washington market to originate local newscasts in HD and the sixth station in a top 10 U.S. market to do so. WUSA also established the first local station Web site to offer streaming of local news.

IP Video

## Senate Committee Grills FCC

**WASHINGTON**

The FCC oversight hearing by the Senate Commerce Committee started off with commission Chairman Kevin Martin heralding the state of the nation's communications market.

Telecom revenues last year generated their biggest increase in five years; fiber connections were up nearly four-fold over the last year; broadband prices are dropping and more people are getting it, he testified.

Then Committee Chairman Daniel Inouye (D-Hawaii) dropped the gloves and quizzed Martin his statement on the AT&T-BellSouth merger vote. Martin, in a joint statement with fellow Republican Commissioner Deborah Taylor Tate, said the net neutrality conditions "extracted" by the Democrats "in no way bind future commission action."

If he disagreed with the conditions, Inouye asked Martin, "Why didn't you withhold your vote?"

"We didn't say we wouldn't stand by it," Martin said. He and Tate simply wanted to clarify that the AT&T-BellSouth net neutrality condition did not represent FCC policy going forward.

Democrats on Capitol Hill deep-sixed telecom legislation last year because it lacked the network neutrality provisions that would keep broadband providers from setting arbitrary fees for various bit-rates. FCC Democratic Commissioners Michael Copps and Jonathan Adelstein held out for a net neutrality condition on the AT&T-BellSouth merger.

"It came to us as a conditionless merger," Copps said. "I think it was necessary."

Without Copps and Adelstein, the merger vote may have ended in a stalemate because Robert McDowell, the third Republican of the five-member commission, abstained. He previously worked for a telecom lobby that opposed the merger, and so recused himself. Copps noted in his opening statement that it might be easier for the commission to get things done if the members could talk to each other.

"Let me make one minor but I think important suggestion," he said. "Modify the closed meeting rule so that we can talk to each other at the commission." Sen Ted Stevens (R-Alaska) said he'd work on it.

Sen. John Sununu (R-N.H.) had white spaces on his mind. He asked Chairman Martin to describe the "tradeoffs" of auctioning fallow broadcast spectrum versus using an unlicensed scheme. Martin said auctioning spectrum licenses would take more time because the commission would have to specifically identify available bands. Without licensing, the commission simply has to demonstrate noninterference, he said.

Localism and ownership got a lot of play at the hearing. Sen. Byron Dorgan (D-N.D.) used the phrase "spectacular failure" five times to describe the FCC's media ownership efforts. He said the commission's last crack at media ownership rules "nearly completely emasculated" public interest standards.

Copps concurred. He said broadcasters used to have to prove they were serving the public interest every three years before their licenses were renewed. Now the process is referred to as "postcard renewal," he said. Copps called for "explicit guidelines" on localism.

The guidelines in place now require broadcasters to do a certain amount of children's programming. Beyond that, Martin said he'd like more feedback on what broadcasters do in the public interest, but he was reluctant to create more programming requirements.

Sen. Barbara Boxer (D-Calif.) hammered Martin on the commission's ownership proceeding. It was Boxer who requested an investigation of the FCC after a suppressed media ownership study found its way into her hands last fall. The study, which suggested that relaxed media ownership rules would diminish localism, was ignored in the formation of the rules issued in 2003. A former FCC attorney said staffers were told to destroy all drafts and copies of the report. At the time, Martin told Boxer he knew nothing about the study, then another one—this one on radio—showed up in her office a week later.

Boxer requested an investigation by the FCC Inspector General's office, which she said at the Feb. 1 hearing would be completed this spring. She also chided Martin for a comment he made more than a year ago at a banquet held in his honor. In jest, Martin said it was fun to work with him at the FCC because of the "KBG-like" atmosphere.

Boxer suggested the comment was truth disguised as humor, and asked Martin what he'd done about the situation since the suppressed studies came to light. He responded that he had every bureau chief turn over every rock and disclose every e-mail that might pertain to media ownership. A total of 1,400 pages worth of documents has been turned over in a Freedom of Information Act request.

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## SBE Offers Management Training

**INDIANAPOLIS**

The Society of Broadcast Engineers has set the dates for its 2007 Leader-Skills Seminar in Indianapolis this summer. Now in its 11th consecutive year of sponsorship by the SBE, the series is specifically designed for broadcast engineers who have, or aspire to have, management responsibilities.

SBE offers the two-part series in cooperation with instructor Richard D. Cupka Sr. of West Lafayette, Ind. Cupka has more than 40 years of experience in adult training and has directed and taught the Leader-Skills seminars to broadcast engineering managers, supervisors and technicians over that same span of time. The NAB previously sponsored this course.

This year, Course I, "Leadership—The Framework of People Skills" will be held June 5-7, at the Holiday Inn Select-Airport in Indianapolis. It covers the function and nature of leadership; how to build stronger teams and effective internal cooperativeness; the complex differences of people; discovery of one's "natural" style of leading and how to nurture a "developed" style to help leaders adjust to different people in differing situations.

There are a limited number of spaces in each course. Deadline to register for Course I is May 2.

Course II, "Leadership—Expanding Your People Skills" picks up where Course I leaves off and will be offered Aug. 7-9, at the same location.

Registration information is available at *www.sbe.org/edu_seminars.php*.

Education

## APTS Conducts DTV Survey

**WASHINGTON**

According to a survey by the Association of Public Television Stations, 61 percent of Americans have no clue about the ongoing transition to digital broadcasting.

APTS revealed that 10 percent of those polled had limited awareness of the DTV movement, and 25 percent said that they were either somewhat or very aware. Fifty-three percent did not know that analog transmissions will end Feb. 17, 2009.

*APTS President and CEO John Lawson*

Roughly 45 percent said they would "do nothing" or "don't know" what they'll do to get digital signals.

Nineteen percent said they would purchase a converter box, 17 percent would sign up for cable service and 9 percent, for satellite. Another 9 percent said they would buy a DTV set.

APTS is now urging Congress to target funding to inform consumers about the impending switchover of television broadcasting from analog to digital.

"There are more than 21 million U.S. households that get their TV exclusively free and over the air, and we know these homes are heavy viewers of Public Television," said John Lawson, president and CEO of APTS. "That puts us, working with our partners, in a strong position to provide information about the digital transition to the people who need it the most."

Survey results were based on a sampling of 2,000 U.S. households conducted in the third quarter of 2006. The survey noted that approximately 19 percent of those responding said that they received television programming off-air.

DTV Transition

## Comcast, C-COR Partner on VOD

**DENVER**

Comcast Media Center and C-COR Inc. are launching "VOD In a Box," a system devised for deployment of video-on-demand in markets of 25,000 or less.

This new approach to VOD is designed to reduce cost, complexity and the time required to roll out services. The project's test phase has now been completed, and customer trials are expected to begin in the first quarter of 2007.

The "VOD In a Box" approach covers all of the basic hardware and software ingredients required to create a stable and reliable service. It incorporates C-COR's On Demand server product and software management platform and can provide some 1,000 hours of free, pay and premium programming. This content will be managed Comcast Media Center receiving equipment, storage and streaming hardware and management software tools. Comcast will also provide installation, professional services and support for the system.

Wave Broadband in Ventura, Calif. has been selected as the first beta testing site for the new system.

VOD

## CBS and Super Bowl Use 103-Incher

**NEW YORK**

Panasonic's new full-resolution 103-inch plasma video displays are being deployed in very visible applications.


*Panasonic's new 103-inch plasma display is now a prominent part of "The Early Show" on CBS.*

The CBS News program, "The Early Show" has integrated one of the giant displays into the program's studio set. It is being spotlighted in the news reader portion of the show and premiered on Jan. 8.

For Super Bowl XLI on Feb. 4, eight of the super-sized screens were installed and used in Dolphin Stadium's Club Level fan area. The monitors provided fans in the main lounge and bar areas an up close and personal look at the action, as the Indianapolis Colts and Chicago Bears fought for victory down on the playing surface.

The Panasonic TH-103PF9UK plasma displays are the world's largest and feature a resolution of 1,920 x 1,080. The screens provide an effective viewing area of 89-by-50 inches and have a contrast ratio of 5,000:1. The 103-inch monitor screen size is the equivalent of four 50-inch units grouped together. The TH-103PF9UK works with 480, 575, 720 and 1080 line video. The new display joins others in the Panasonic lineup of plasma technology units ranging in sizes down to 37 inches.

Plasma

## CBS Affiliate Tries SMS Marketing

**KANSAS CITY**

KCTV-5, the CBS affiliate in the home of Royals baseball, is embarking on an interactive ad campaign using short messaging service, otherwise known as "texting."

KCTV has contracted Encino, Calif. firm Pop Solutions to launch a series of efforts designed to connect KCTV and its advertisers to the station's audience via viewers' cell phones. News stories, for example, will allow viewers to weigh in by texting specified codes. Once a text is received, a response is automatically generated inviting the viewer to opt in for ongoing promos, reminders, ring tones, wallpapers and contest entries.

"I'm excited about the possibilities that POP Solutions brings to the table," said Regent Ducas, KCTV news director. "I believe the viewers will find interactive news different and have another reason to watch. And we'll quickly see the results of our efforts in our newscast."

Joe Gorelick, executive vice president of POP Solutions, said that once opted in, "the station captures data that results in a time-stamped database report with the respondent's cell phone number, usage, preferences and any other demographic and psychographic data collected as part of ongoing campaigns."

News-response arrangements are common on the Web, but not so much on TV, where SMS-ing has been more heavily used in entertainment shows like "American Idol." Advertisers have made their own direct connections, according to Brandweek. Pepsi initiated a texting campaign during National Football League games for fans to vote for Rookie of the Year.

POP was engaged last year by Ford, which sponsored a concert tour where fans were encouraged to text for backstage passes and go to the automaker's Web site to enter a contest to win a Lincoln Zephyr.

iTV

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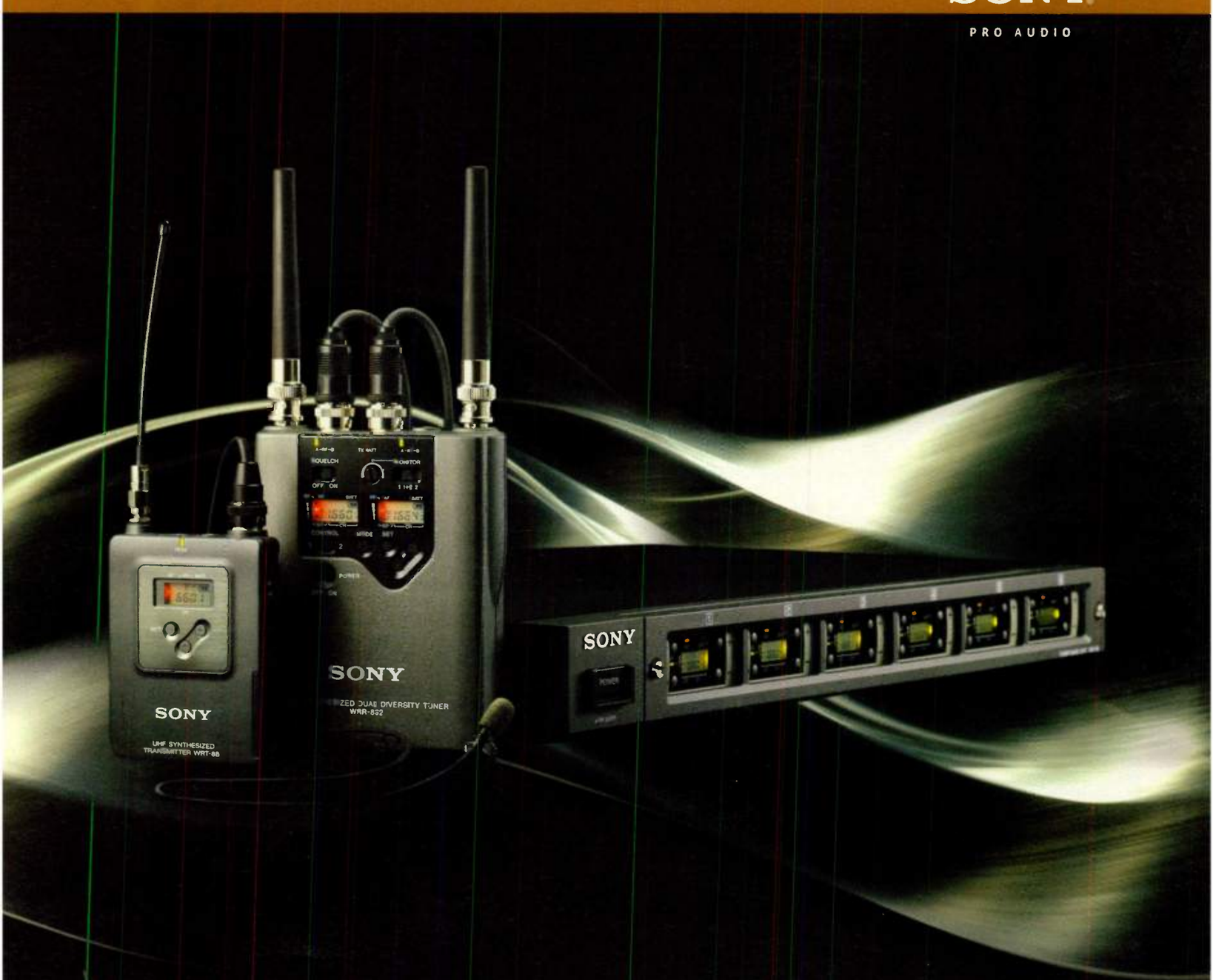


THE NEW WAY OF BUSINESS℠

# NAB DTV Head Emulates OTA Viewers

## DTV deadline message will resemble political campaign

Unless the law changes again, analog television broadcasting will cease in this nation 734 days after this issue of TV Technology hits the street. The original deadline—Dec. 31, 2006—was shifted by Congress a little more than a year ago when it became apparent that the date simply would not work. With regard to broadcasters, conflicts over tower sites delayed construction in some markets. International coordination was nowhere near completion. The digital channel selection process necessitated further, major changes in transmitter facilities. Low-power TV stations and translators were not even on the radar screen.

However, none of these things swayed Congressional zeal to reclaim the DTV transition spectrum as much as another singular reality.

Jonathan Collegio

The public remained virtually unaware of the shutdown to come. A new law superseding the old one established Feb. 17, 2009 as the end of over-the-air, analog TV service.

Now, two years shy of the deadline, progress continues on the issues affecting broadcasters. Most stations have selected their final DTV channel, so new antennas can now be ordered and erected. Construction has begun on a new tower in the Denver market, where local opposition to its placement held it up until late last year. Consideration for low-power licensees and translators is underway, as well as international coordination.

The public, however, remains largely unaware of the shutdown to come. A recent survey from the Association for Public Television Stations indicated that 61 percent of participants "had no idea that the DTV transition was taking place," according to APTS. Another 10 percent said they had "limited awareness," while about 25 percent had a clue. More than half, however, didn't know when analog broadcast signals were scheduled to end.

Congress has designated $5 million for educating the public about the DTV transition. The sum represents less than a minute of airtime during the Super Bowl. The agency in charge of the federal education effort, the National Telecommunications and Information Administration, has beseeched all players to come to its aid and help coordinate a national awareness campaign.

Without further ado, the NAB created its own team to run an education program like a political campaign. As NAB's vice president of the digital TV transition, Jonathan Collegio will head up the four-person group. A former associate producer at a cable news network, Collegio has worked on political campaigns and was previously press secretary for the National Republican Congressional Committee. Here, he shares a few of his thoughts on the DTV transition with TV Technology Managing Editor Deborah D. McAdams.



**TV TECHNOLOGY:** What is your experience with broadcast television?

**COLLEGIO:** I grew up in rural southwestern Oregon where we were an OTA family. We grew up with four free channels—the networks plus public television—and by age seven, I had the programming schedules of our four local channels burnt into my memory.

**TV TECHNOLOGY:** Have you ever used an antenna to receive television?

**COLLEGIO:** Yes, as a matter of fact for the past two years, and I plan to for the next two!

As the vice president for DTV transition campaign, I want to best self-emulate the OTA consumers we're trying to reach.Consumers who don't want to sign up for cable or satellite services will be able to buy digital-to-analog converter boxes, or can purchase new television sets with built-in digital tuners.

So in 2007, I'll be receiving free broadcasting at my home with an antenna, and using a prototype LG converter box with an older analog set. All of the DC stations are currently broadcasting in digital.

In 2008, I plan to purchase a new set with a digital tuner. I also plan to perform each setup—and then I'll ask my wife to, as well. I'm sure she'll have an easier time than I.

**TV TECHNOLOGY:** How much money do you have to work with?

**COLLEGIO:** I can't give you a specific dollar amount from NAB at this point, but it will be in the seven figures. Completing a successful transition to digital television is the NAB TV board's top priority, and we intend to use every available resource we have to ensure that success.

And if you take into account the market value of network and local station airtime used for the DTV public service announcements we're planning to produce, you're looking at a campaign that will run well into the tens of millions of dollars by transition day.

**TV TECHNOLOGY:** Who is your target audience?

**COLLEGIO:** We estimate that 19.6 million households receive OTA broadcasting-only in their homes. More than 34 million households receive some form of OTA in their homes—either on primary or secondary television sets. While the campaign will inevitably reach far beyond OTA consumers, these are the folks we really need to reach.

We must also focus on demographic groups that are disproportionally affected by the transition—specifically seniors, folks in low socioeconomic brackets, minorities, and those living in rural areas.

Our campaign will help coordinate a large DTV transition coalition, with members as diverse as the NAACP, AARP, Consumer Electronics [Association] and public television stations to try to reach their members with information about the DTV transition.

We need to make sure everyone with an interest in a smooth transition is reading from the same page—if everyone is on a different message, the din of clutter will be so great that no

EMULATES, PAGE 32

BRING IT ON...

# TrollCam HD

**Because, UNTIL NOW maintaining outdoor cameras hasn't been pretty.**

***HEAT EXCHANGE SYSTEM***
***TrollCam HD*** - features continuously circulating airflow to remove heat from the sealed payload compartment. Air is forced over the front of the glass to create a constant curtain of air. This AIR CURTAIN prevents the accumulation of bugs, dust or moisture, eliminating the need for mechanical wipers.

***SUN SHIELD***
protects the enclosure from extreme heat.

***AIR CURTAIN AIR FLOW***
Air exiting the heat exchange system has warmed slightly to prevent any frost that could form on the glass in colder climates.

***AIR CURTAIN***
Continuously sweeps dust, bugs and moisture from exterior glass.

***AIRJET***
Provides a 100 PSI, HIGH PRESSURE air blast to instantly remove any dust, bugs and moisture - not repelled by the AIR CURTAIN.

***POSITIVELY PRESSURIZED PAYLOAD HOUSING*** ***creates a totally sealed camera compartment*** eliminating moisture intrusion and condensation.

***NEMA-4 RATED CAMERA ENCLOSURE***
Provides protection from bugs, spiders, dirt, rain, sleet, snow, wind-blown dust, splashing water, hose-directed water, ice formation and extreme cold or heat.

***24/7 AIR INTAKE FAN***
pulls filtered air over the sealed payload, drawing heat away from the heatsink, providing a steady stream of air for the AIR CURTAIN.


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# Leading Tape Maker Goes Tapeless

## Quantegy ceases production of magnetic recording medium

by James E. O'Neal

OPELIKA, ALA.

The last old-line American manufacturer of magnetic recording tape has quietly announced to the world that it will cease manufacturing tape products in a matter of months.

"Unfortunately, as technology improves, there is a decrease in demand for magnetic tape media," the company said last month. "It is for this reason that Quantegy is now discontinuing certain magnetic tape products."

Quantegy and its precursors have been headquartered in this small eastern Alabama town for more than 60 years and have supplied countless reels, pancakes and cassettes of recording tape to radio and television stations, recording studios and production houses throughout America and the world.

According to Josh Herron, marketing manager for Quantegy, the decision was not an easy one, but the handwriting had been on the wall for some time.

"Over time, the demand for our products has dwindled due to the changes in recording technology," Herron said. "This was a difficult decision, but we have to go with the times. From this point on, we'll be concentrating on new recording technologies."

Herron said that Quantegy will be taking orders until the end of February and will keep production lines running as long as necessary to fill all of the "last call" orders coming in. The last few inches of recording tape are expected to be spooled off some time in April.

*The last length of magnetic tape is expected to be produced sometime in April.*

Herron pointed out that there were no immediate plans to disassemble the production equipment, saying "if other coating opportunities present themselves, this would be an option for us."

Quantegy has no plans to relocate or trim its workforce either.

"We plan to stay here in Opelika," he said. "We're not thinking of taking operations anywhere else. The company has too long of a history here to consider moving."

Quantegy now employs approximately 70 people, down from a peak of nearly 2,500 a decade ago.

"We're receiving an influx of orders now and we'll need all hands to fill them," Herron said. "We have no plans to cut our workforce. We're not nearly as big as we were before the company reorganization in 2005."

Quantegy is currently marketing its FHD and Black Diamond lines of hard drive storage systems and expects to see continuing expansion and growth in this area.

"We introduced some new lines at the last AES," Herron said "And we have some other things in the works we can't really talk too much about now."

### POSTWAR STARTUP

The Quantegy operation is very closely linked with the beginnings of magnetic tape recording technology in the United States in the years immediately following World War II.

At the end of the war in Europe, one U.S. military officer, Major John "Jack" Mullin, transplanted German audio recording technology to the United States with the importation of AEG's Magnetofon recorder. This machine served as the starting point for Ampex's involvement in audio recording.

Another military officer, Major John H. Orr, independently realized the postwar potential for audio tape recording, and upon returning to America, established his own recording tape manufacturing business, Orradio Industries, in Opelika.


*One by one, these American magnetic tape lines have vanished from the production scene.*

Orr began operations in the basement of a local drugstore. The business ultimately grew to approximately 500,000 square feet in multiple buildings on a 36-acre tract. Early on, Orr was assisted by a German scientist with knowledge of magnetic recording media, Karl Pflaumer, in his efforts to produce a quality product. Orr's first tapes hit the market in 1949. The company became well known for its "Irish" line of recording tape, one that was favored by recording studios and broadcasters alike.

With the rise in popularity of magnetic recording in the early 1950s and onward, Orr's company had many American competitors, including Audio Devices, Minnesota Mining and Manufacturing (3M), Eastman Kodak, RCA and Soundcraft.

Orr sold his company to Ampex in 1959, and was reorganized as Ampex's

TAPELESS, PAGE 14

# KAYAK HD



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# Building Out for Mobile Video

## Vendors provide new repurposing solutions to manage digital content

by Robin Berger

LOS ANGELES

Manufacturers are using different tactics to automate production and distribution, facilitating, among other things, to repurpose content beyond the traditional TV screen.

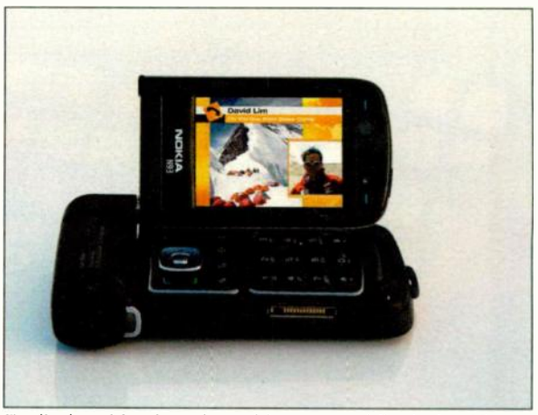
### AURORA AND SAPPHIRE

"The idea that we work from is 'create once, publish everywhere,'" said Ed Casaccia, director of product management and marketing for Grass Valley's Digital News Production division, which oversees the company's two-year old Aurora Software Suite for digital production.

In 2006, Grass Valley added support for additional play-out servers and external media like Sony XDCAM HD. But Casaccia said the biggest update is that "Aurora is real, it's delivered, it's on the job and it's allowing broadcasters to become first with real high-definition production."

However, Aurora's end product is still just a file on a server. To manage the bitstream and send it to mobile devices, Casaccia looks to Grass Valley's Sapphire Mobile TV, which debuted at IBC2006 and was commercially deployed soon after.

At presstime, it was being trialed by mobile TV networks in Europe, according to Jean Macher, director of marketing for Video Network Solutions for Grass Valley.




*To display video-based graphics on a mobile device, Vizrt offers its Viz\|Engine renderer that keeps graphics and video components disassociated until the last moment, compositing them directly on the viewer's display.*

Sapphire's VOD server ingests, manages, and distributes content into mobile applications, taking account of targeted parameters.

"As a professional offering dedicated to mobile TV, to my knowledge, Sapphire is the first," Macher said.

John Delay, director of strategy for the Harris Broadcast Communications Net-working and Government Initiatives division says its "Intelligent Media Mover" is "what separates Harris' media management platform from all the others in the market."

IMM was launched at IBC2006 as part of a multiplatform program distribution system marketed by VT Communications, a U.K.-based broadcast services provider, along with the Harris NetXpress transport solution, D-Series Playout Automation system and NetBoss network management system.

IMM is "core to VT Communications' ability to redirect and, if necessary, repurpose media based on user-defined business rules," the companies said.

"You're telling the system to go to the particular server, pull a particular piece of content out, run it through a process, move it to a different server and have it ready for use by the wireless operator," said Taras Bugir, chief strategy officer of Harris Software Systems.

BUILDING, PAGE 16

## Tapeless

CONTINUED FROM PAGE 12

Magnetic Tape Division and eventually became known as the Ampex Recording Media Corp. As part of Ampex's redirection 35 years later, the tape manufacturing division was renamed Quantegy Inc. This was later changed to Quantegy Recording Solutions LLC.

### TIMES CHANGE

Over time, other recording technologies began to augment and replace magnetic tape and one by one, all of the other American recording tape contenders slipped by the wayside until only Quantegy remained.

With a declining demand for its products, the company declared bankruptcy and closed down manufacturing operations in January 2005. Not long afterwards, the company was sold to a new owner, and in April of that year, magnetic tape manufacturing operations were started up again, and have continued until now.

Herron noted that while there were still off shore suppliers for some of the products being eliminated with the shutdown of Quantegy's tape operations, other product lines were unique.

"We are the last supplier of tapes for telemetry and data logging in the world," he said.

He observed that closing down audio tape production had been a very difficult decision.

"We've got extremely loyal customers who have stood by us and our brand," Herron said. "They've told us that ours is the only tape they'd use.

"We've been really proud of our service to the industry for so long and know that our name will always be part of the recording industry. Tape has been our life since the end of World War II, but it's time now to move on."

### ANOTHER DOOR OPENS

Even though tape production is ending in Opelika, reel-to-reel recorder owners won't have to send their machines to museums or landfills just yet. Another American company ATR Magnetics LLC, a division of ATR Services, in York, Pa., has decided to pick up the baton and move out.

Mike Spitz, a partner in ATR, said that his company made plans to enter the tape manufacturing market 2004 and has been involved in product development since that time.

ATR has just concluded product beta testing and is in the process of ramping up to full blown production. Spitz says that product should be shipping by April. ATR will initially supply 1/2-inch and two-inch audio tape, and has plans to manufacture one-inch and 1/4-inch stock later. ■

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# Building

CONTINUED FROM PAGE 14

At NAB2007, Harris plans to demonstrate MPEG-4 capabilities for Base-Profile encoding, the format required for mobile TV applications, according to John Delay, product line manager for H-Class digital asset management.

For Avid, the key to managing digital content media is simplicity.

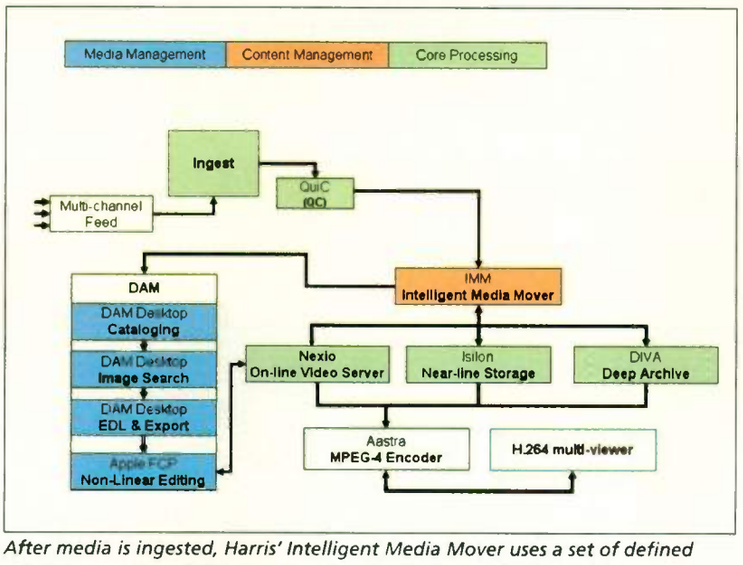
"We tried to look at the entire workflow—end-to-end—and simplify that as much as possible, without sacrificing any functionality," said Mike Milligan, senior product manager for Avid Interplay in Tewksbury, Mass. "Asset management is, certainly, one of the key capabilities, but it's not the only capability."

The other key elements of this three-part system are workflow automation and security control, Milligan said.

And he emphasized that Interplay is "the world's first nonlinear workflow engine," one increasingly open to third parties.

"We're investing in our infrastructure and our APIs to allow more companies to more easily integrate into the Avid Interplay environment—companies that would do encoding, transcoding, asset management..." he said.

At NAB2007, "you're going to see an area in our booth that's actually dedicated to workflows—end-to-end workflows that have some Avid products in there, and non-Avid products."




*After media is ingested, Harris' Intelligent Media Mover uses a set of defined rules to manage and direct content for distribution to diverse platforms.*

*Avid Interplay Access*

**"We tried to look at the entire workflow—end-to-end—and simplify that as much as possible, without sacrificing any functionality."**

**—Mike Milligan, Avid**



## GRAPHICS COMPONENT

Vizrt's Viz|Multi-Platform Suite keeps graphics and video components disassociated until the last moment, compositing them directly on the viewer's display.

The solution is based on Vizrt's Viz|Engine renderer and an MPEG-21 standards-based multimedia delivery platform developed by Adactus a Norwegian-based company specializing in the transport of content to mobile phone platforms (Adactus is now owned in part by Vizrt).

"It's defined to fit very easily in the workflow," said Adactus CEO Peder Drege. "You hit 'Take,' something goes on-screen, and the process is automated for cross-platform distribution."

Moreover, he said, the solution has an application to override browser functions, so broadcasters can custom-design how their content is presented.

At presstime, MPS was being tested by broadcasters in the U.S., Europe and Mexico, Drege said.

## CAFÉ SERVICE

For NETIA, a Claret-France based technology provider, NAB2007 will be the U.S. launching point for Manreo Café, a software solution designed to maximize productivity gains in media asset management, according to its provider, Claret, France-based NETIA.

French cable news channel LCI (La Chaîne Info) uses Manreo to enable Orange, a mobile phone service provided by France Telecom, to stream live news flashes and sports video clips to its cell phone subscribers.

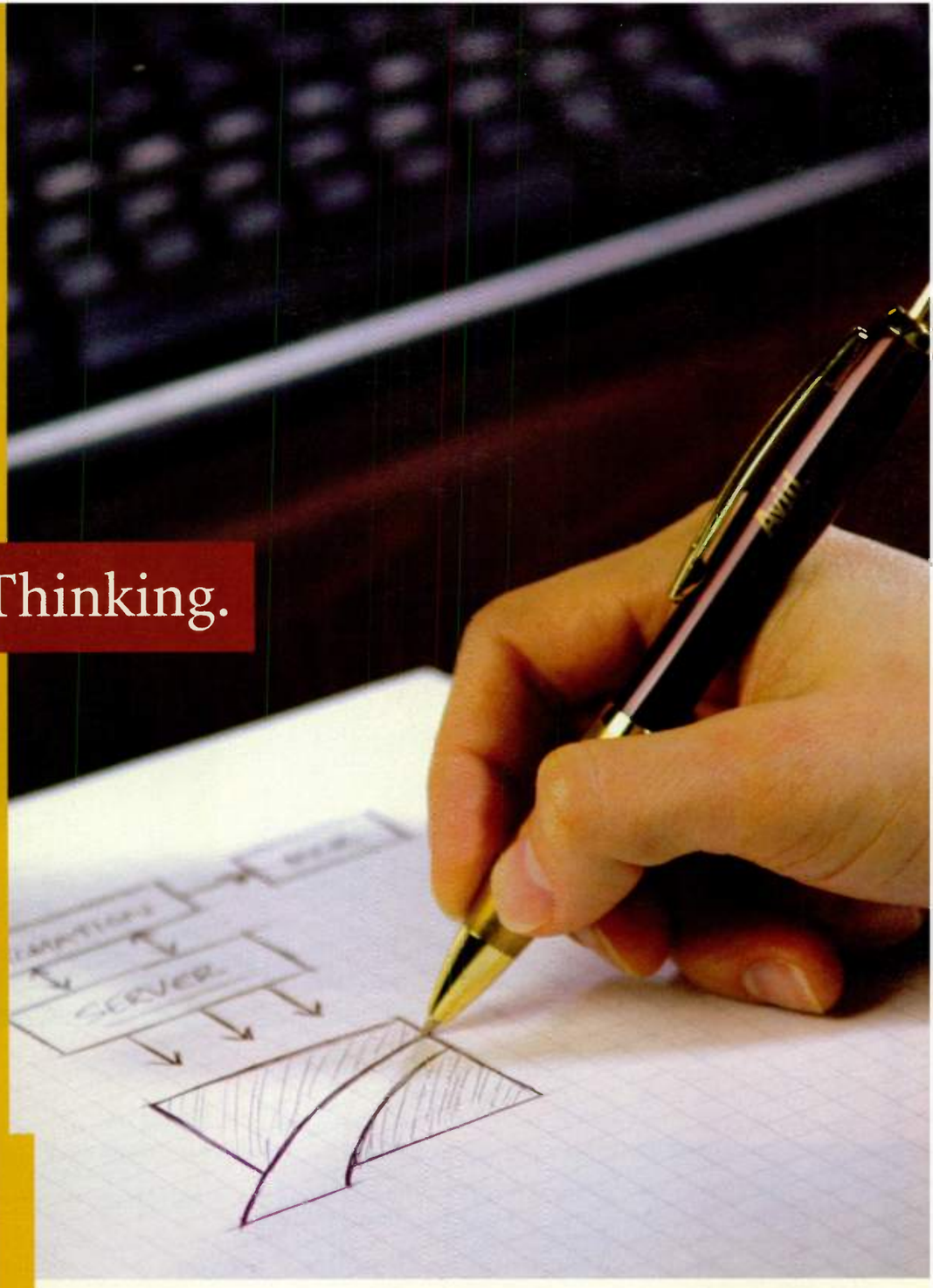
LCI installed Manreo at its own premises in 2004, choosing it because of its flexibility and its image detection and video processing components, according to Marie Grannet Vuillemin, a project manager in the Strategy and Technological Innovation Department of TF1, LCI's parent company. Problematic at first, the app began to run well by mid 2005.

Simplicity is the cornerstone of the Manreo solution, said NETIA director of operational marketing and communication, Stéphanie Boisset.

"The efficiency of operation results from being able to manage the whole workflow with one piece of equipment," she said.

Moreover, she said a partnership with a company called Main Concept lets Manreo offer a product for encoding in AVC H.264.

"The telecom operator does not have to send a degraded version," Boisset said. Recipients "are provided a very good quality file from the beginning." ■

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# Maki

## New Series o


"Planet Earth" producers used the Cineflex Heligimbal, which was usually equipped with a Sony 750 HDCAM and Canon 400 mm zoom lens to capture images from hundreds of meters away.

Actor Sigourney Weaver narrates the 11 episodes of "Planet Earth" for the BBC and The Discovery Channel.

**by John Merli**

BETHESDA, MD.

"Planet Earth," a new 11-hour HD series from the BBC, will air on five consecutive Sunday evenings on Discovery HD and Discovery Channel, beginning March 25. The ambitious project deployed 70 producers and camera operators to more than 200 locations globally over a five-year period with the assignment to capture living natural history in HD detail.

The result prior to post production was several hundred hours of tape depicting scenes in the wild rarely ever seen by humans—thanks to the ability to shoot from unobtrusive aerial vantage points through high-powered lenses, courtesy of the Cineflex heligimbal.

### UNDERCOVER

The gimbal from Cineflex LLC, based in Grass Valley, Calif., is a gyro-stabilized aerial unit that, for this BBC production, was equipped with a 400 mm Canon zoom lens that was able to closely track wildlife in natural habitats from hundreds of meters away without being detected by the animals.

"It was truly amazing to be able to suddenly film certain things from the HD aerial gimbal in a matter of days or weeks that would have taken perhaps years to film," said Huw Cordey, a veteran BBC producer who was responsible for three episodes in the series ("Caves," "Deserts," and "Jungles"). "Some of these sequences would never have been captured had we not been [shooting] from so far away and had our presence been known by the wildlife."

Cordey used 14 camera operators for shoots in the Gobi Desert of Mongolia and the Australian outback, among other locales. The "Caves" episode, the final installment airing April 22, took Cordey's team to the Lechuguilla Cave in New Mexico, the deepest known cavern in the continental United States.

"We shot a lot of footage on the Sony HDW-750, especially where we were controlling the light, such as in the cave," he said.

A Sony HDC-950 was used for much of the aerial gimbal shooting, along with a Canon HJ40 400x lens. The Panasonic Varicam, which Cordey sometimes used to give some sequences a film look, also got a workout at other sites.

The entire series—spanning nearly 2,000 shoot days—was captured in 720p, 1080i and 1080p—as well as a few sequences on HD-friendly 35mm film. Discovery HD will air the series in 1080i. Dolby 5.1 Surround Sound also will be featured, although much of the audio was laid in later (along with narration by actress Sigourney Weaver)—especially footage obtained from the heligimbal, which was too far away from its prey to record pertinent audio (which, in turn, would have been drowned out by aircraft engines).

### FILM AND VIDEO

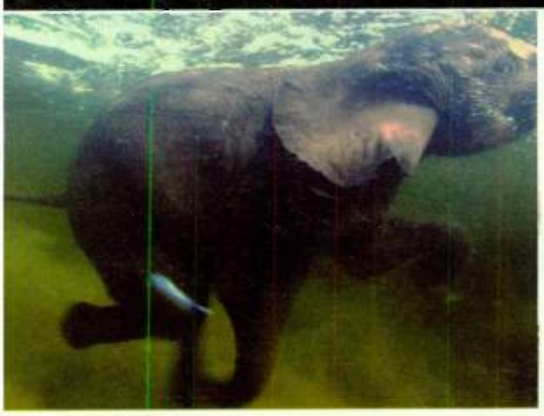
Cordey said he found the technical jump from film to HD tape far simpler than he would have

BBC producer Huw Cordey explores the Lechugguilla Cave in New Mexico, t deepest known cave in the continental United States.

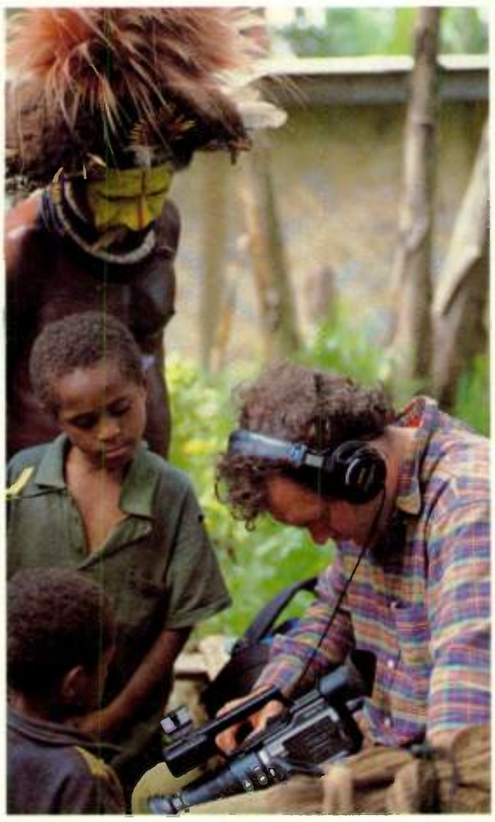
# g a Highly Defined Planet Earth'

## iscovery HD yields unprecedented nature footage

Rare footage of a golden snub-nosed monkey on the March 25 premiere.



Rarely captured footage of elephants swimming underwater in the Okavango Delta off Botswana.



Cameraman Paul Stewart with Huli tribe members in Papua, New Guinea.

The uninviting face of the vampire squid, captured in HD for the "Deep Ocean" episode of "Planet Earth."

imagined.

"It was actually surprisingly easy," he said. "I'm a film man working in natural history. Film cameras typically are very reliable. Working in natural history is operating in an aesthetic medium, and film creates that cinematic look we sometimes go for. We found for the first time that a video camera such as the Panasonic Varicam and [Sony's] could compete with film cameras on frame rate, reliability and other big issues."

Some of the camera work's vantages points were unique, he said.

"Being able to film something is one thing, but you're looking at something sometimes familiar, sometimes very unfamiliar, from a totally different perspective" via the aerial gimbal, he said. "We have this wonderful opportunity to see exotic animals actually interacting within the context of their own environment."

When preproduction began more than five years ago and it was decided to shoot in HD, the commercial prospects for high definition (especially in Europe) were still very much *up* in the air, rather than *on* it. (When the BCC aired the new series last month in the United Kingdom, it was in SD, not HD.) And in North America HD was still in it infant stages.

"Five years ago, deciding to go HD really speaks of [Discovery Founder and Chairman] John Hendricks' vision," said Maureen Lemire, series executive producer for Discovery Channel. "A few years ago, high definition was

'PLANET EARTH', PAGE 20

# 'Planet Earth'

CONTINUED FROM PAGE 19

still a new format for most camera operators, and back then there had been rumors that were not good about dealing with HD."

Lemire, a former freelance producer, said the BBC knew without some recent technical advances, several of the series' sequences would not have been feasible.

"Capturing the Blue Bird of Paradise in low light never would have been possible without HD," she said. "Some people may have become a bit jaded with HD over the years, but viewing a lot of these scenes will cure that."

A humpback whale breaches in Antarctica.

She said the bird's mating ritual is the first ever captured by electronic media of any kind.

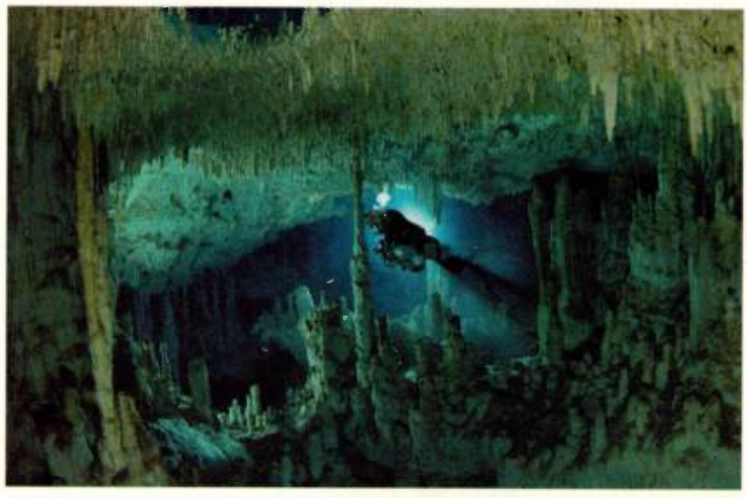
One of the relatively few technical problems encountered by the Cordey crew on location was the extreme cold.

"We were on location in the Gobi Desert in Mongolia with virtually no roads or maps," Cordey said. "We used GPS navigation to get around. The temps were down around –30 [Fahrenheit] and we were staying in tents. We didn't know it when we started, but our best chance to capture HD images of a herd of wild camels came very early in the journey.

"We had this amazing opportunity on a stunning day—a blue sky, glistening snow, no wind," he continued. "We spotted the wild herd and we filmed all of it. When we got back to camp and looked at it through the black-and-white viewfinder, it looked great. But we soon discovered something had happened to the blue channel and everything looked yellow. The cold weather had knocked out the blue channel on the chip. We quickly learned to start up cameras well before actual filming to warm them up."

**"Some people may have become a bit jaded with HD over the years, but viewing a lot of these scenes will cure that."**

**—Maureen Lemire, Discovery Channel**



A BBC camera operator films in the flooded caves of the Yucatán in Mexico.

An iceberg with aurora southern lights will be featured in the "Ice Worlds" episode of "Planet Earth" on April 1.

Lemire said every episode will be followed by a two-minute behind-the-scenes look at how some of the footage was captured. On April 24, two days after the Discovery channels air their final episodes, the series will be released on standard DVD. Soon thereafter, it will be released on HD DVD and Blu-ray Disc. ■

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*The Lens Creates the Image*

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Canon

imageANYWARE

# Audio for Video Finally Getting its Due

## Console makers note uptick in business

by Mary C. Gruszka

NEW YORK

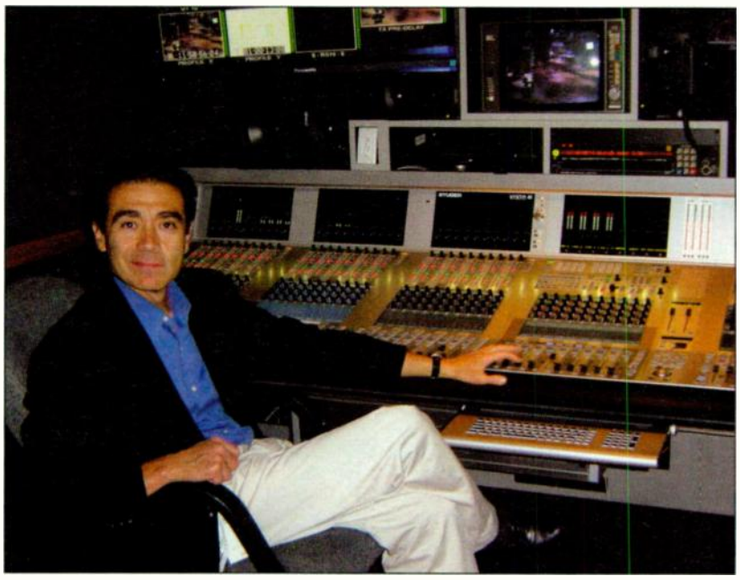
As the transmission end of the digital transition nears completion, stations are turning their attention more to the studio and control room side of their facilities. And audio is definitely part of the mix.

"This January has been the busiest start we have ever seen to a new year," said Andrew Wild, vice president of marketing for Euphonix in Palo Alto, Calif. "The pressure is on for facilities to upgrade to HD, which includes upgrading the audio console to handle larger numbers of channels encountered with surround operations and to go fully digital."

People are upgrading for other reasons as well, said Phil Owens, a sales engineer with Wheatstone in New Bern, N.C.

"The biggest [reason] remains the replacement of old outdated equipment that represents a liability to the station. Others are involved with creating automated news operation," he said.

Wheatstone products include the D-10, D-12, D-5.1 digital consoles. Owens said that the company's TCP/IP interface capability has become an increasingly important feature in new installations involving automation.



*Jorge Silva, audio mixer for the NBC daytime show "Martha," mixes audio for the broadcast on the Studer Vista 8.*

For the mobile production truck people, upgrading also means shifting from older digital gear to the latest generation of digital audio technology, said Kevin Emmott, marketing coordinator for Calrec in West Yorkshire, England.

"Many of our customers, particularly truck operators who regularly mix for live sports and entertainment are upgrading their existing consoles to Bluefin," he said.

Bluefin is Calrec's HDSP—high density signal processing—technology.

"Conventional DSP systems are limited by the number of signals that have to pass from one DSP card to another, which have to fight for space on the backplane along with input and output signals," Emmott said. "As this space is limited by backplane speed and the physical space for tracking, the size of the system is constrained. Bluefin HSDP overcomes this by condensing all the DSP onto one card. Bluefin also provides 480 fully equipped mono equivalent channels on the Alpha and 320 fully equipped mono equivalent channels on the Sigma console, on just one DSP card. Bluefin will be introduced on the Zeta console at NAB2007."

Bluefin also allows for substantially more delay and other processes that were impossible with a traditional DSP core, Emmott added.

With the upgrade to digital, surround sound capabilities are increasingly becoming part of the package. Yet its importance can't be discounted, said Claude Hill, sales director for La Vergne, Tenn.-based Harrison Consoles, maker of the Trion console.

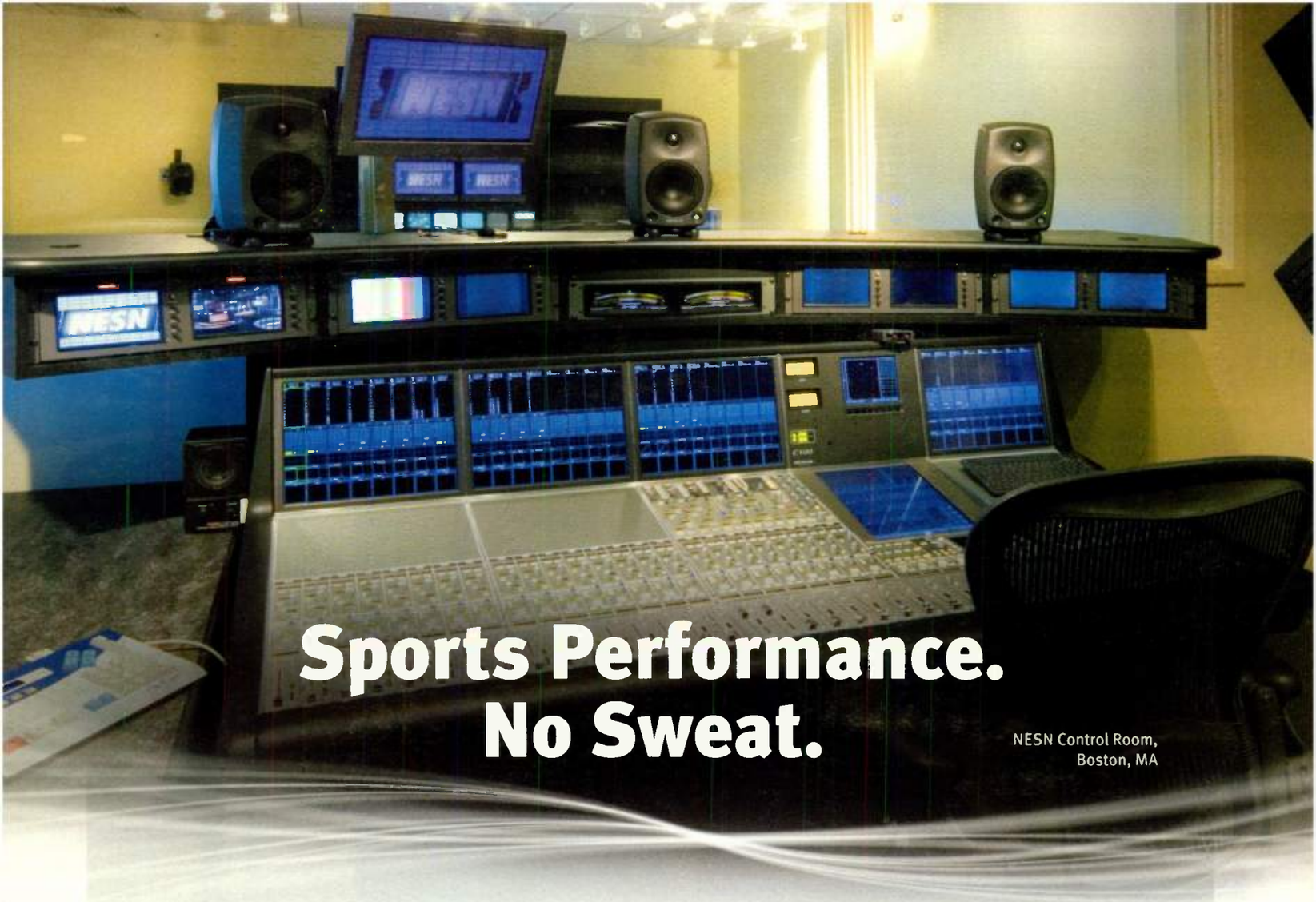
"Very few customers today will consider an audio console that does not have 5.1 or is not 5.1 capable because the future is clear for all terrestrial broadcasting, cable and satellite content delivery," he said.

**"Very few customers today will consider an audio console that does not have 5.1 or is not 5.1 capable."**

**—Claude Hill, Harrison Consoles**

Considering that the lifespan of an audio console could be 10 years or more, Clayton Blick, national sales manager at Studer USA in Northridge, Calif., said, "Customers don't want to box themselves into a corner and buy a console that is not surround-capable." Even with a 5.1 console, "it doesn't mean that they have to broadcast 5.1 today. Moving to 5.1 is daunting for some people. They can start by simply passing 5.1

AUDIO, PAGE 24

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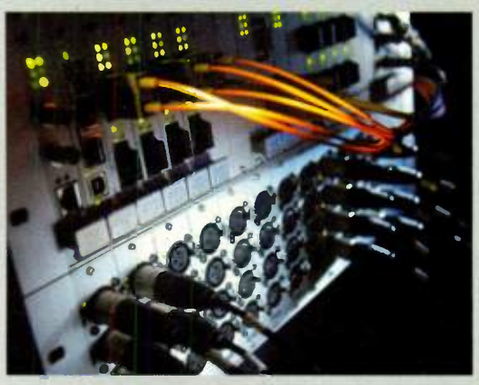

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## Audio

CONTINUED FROM PAGE 22

sources in and out, like network or taped feeds."

For productions, he said, they can "maybe synthesize something in the rear speakers. Later they can explore 5.1 mic techniques."

Hill said price, too, is having an effect, in some cases.

"The availability of digital systems at costs lower than analog has motivated many customers to proceed with upgrades and new facilities," he said.

### NEW DEMANDS

Logitek Electronic Systems, known for its radio boards and audio metering systems, has entered the TV market with its introduction of the Artisan digital console.

Frank Grundstein, director of sales for Logitek in Houston, said Logitek's Artisan series router-based console "is designed to have the features that medium to small market stations are looking for at a price that they can afford."

As more stations upgrade, they need to look for a console capable of handling large numbers of channels, in a scaleable way so that the console can be upgraded as requirements change, said Wild at Euphonix.

"The larger the station, the more ambitious the shows. So the larger stations want to be able to handle a wider variety of shows with more channels," Wild said. "The smaller stations still need all the main features of a broadcast console but usually want a smaller footprint, lower cost and fewer channels. That is why Euphonix offers two systems, System 5-B for larger facilities and Max Air for the smaller stations where space and cost are at a premium."

Studer makes the Vista 5 with 32 faders and, with layers, the equivalent 242 mono or stereo positions, and also the Vista 8 with a redundant operating system, larger meters, and up to 72 faders with 482 positions, Blick said.

"We can cover the whole range with those two," he said.

Ease of use and a clear operator interface would top many customers' list of requirements. For those used to mixing on analog boards, software-based digital consoles can at first appear intimidating, with surround mixing adding to the anxiety. But manufacturers have devised various strategies in console design and user interface to make that transition easier.

Depending on the design philosophy, consoles can use inline controls or a central control panel, but in either case, allow for quick and easy adjustment of the various parameters. Layers can be kept at a minimum, or if they are used, then an easy means for control is provided.

Take SSL for example.

Niall Feldman, director of product marketing for the Oxford, England-based company, said that a console should be easy to operate in surround, with the console taking care of the complexity of the mixing process while letting the operator concentrate on balancing the show's audio.

"The C-series consoles deal with this through advanced features such as surround channels with multichannel EQ, dynamics and panning that present the operator with a simple, single-channel approach to a surround source," Feldman said. "Also powerful and adaptable monitoring that allows complex insert facilities for surround encode/decode systems mean that what the operator hears, is what the domestic listener hears."

Redundancy is another big issue for consoles used for live production. Wild said that Euphonix provides 100 percent secure DSP/router capabilities on its broadcast consoles.

Studer can provide redundant power supplies, a redundant DSP, and a redundant operating system with mirrored data for its Vista 8

AUDIO, PAGE 30

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# NHL Shoots Its Way Back

## League works to raise the bar on production, increase distribution

by Sanjay Talwani

WASHINGTON

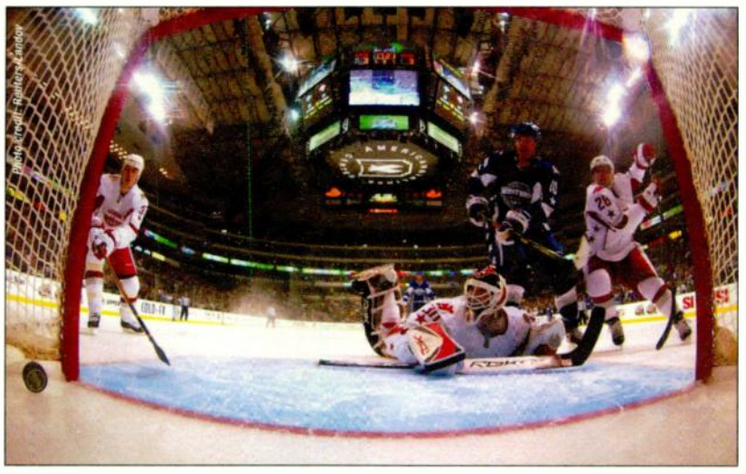
Two winters ago, the National Hockey League suffered what every sport wants to avoid: an entire season lost to a labor dispute, which alienated fans and hurt the league's position in the ever-competitive television sports marketplace.

Now in its second full season back, the league wants to offer more by boosting the quality of its broadcasts and bringing the ice to more channels.

John Shannon, who has been producing hockey games since the 1970s, joined the NHL as its new senior vice president of broadcasting in March 2006 to see what could be improved.

With local and regional networks producing most of the NHL's 1,250 regular season games each year, those multiple broadcasters—serving 30 clubs, from Edmonton to Tampa Bay—Shannon had a lot of people to get on board.

"Our fans are very loyal, and they watch their team specifically through their regional sports network," said Shannon. "We needed to find a way to help all the regional sports networks improve quality. We needed to raise the bar in production across the board."



*Patrick Marleau of the NHL Western Conference watches the puck go by Eastern Conference All-Star goalie Martin Brodeur as his teammates Zdeno Chara (L) and Brian Rafalski look on during the second period of the NHL All-Star game in Dallas, Jan. 24.*

### CAMERA ETIQUETTE

More than in most other sports, hockey broadcasters share game cameras and replay cameras between the two clubs. The league wanted standards and this year created a camera certification program for all the clubs to work toward a more consistent viewing experience, from framing to lighting to following the action.

"I would call it 'camera etiquette,' that we want to put in place for the game cameras so they cover the game the same way," Shannon said, " So no matter what arena you're in, no matter what country you're in, that game camera frames the game the same way, so the viewer has an opportunity to understand how the flow of the game works and where the puck is almost all the time."

The unique broadcast needs of a given market are important but only represent about 20 percent of the picture, Shannon said.

"Game coverage—how they cover a face-off in the offensive zone, and how they cover a shootout, and where the replay starts to show why something happened on the ice—those are key issues that need to be more standardized so that viewers understand their game better," he said.

In the '90s, Fox Television took a shot with FoxTrax, the puck that appeared to leave a glowing comet-like trail when in motion, but many fans hated it.

"What we're trying to put into place is a really simple approach to game coverage," Shannon said. "We've tended to hide behind technology, bells and whistles and sound effects and not understand that we can have all those toys, all the fancy cameras, but if we don't understand why the puck was in the net and why that player took the penalty, and who that person is, we haven't succeeded in everything. Technology will enhance, but we can't hide behind it."

Yet overall, hockey has come a long way from the old days. Robotic cameras are now essential to the game, including cams in the nets and on rails atop the boards, and a goalie-mounted mini-cam. The game uses more wireless mics, including mics in the goalies' masks that allow on-air conversation between the goalie and announcers during breaks.

**"What we're trying to put into place is a really simple approach to game coverage."**
**—John Shannon, NHL**

### CLEARER ICE

During the current season, more than 450 of the league's 1,230 regular season games are being broadcast in high definition. In the summer of 2006, NHL Commissioner Gary Bettman set a goal of broadcasting all the games in HDTV in two years—by the start of the 2008-2009 season.

Versus, the Comcast-owned channel (formerly the Outdoor Life Network), went all-HD this year. NBC does two of its three weekly games in HD, and in Canada, CBC does them all.

"It's driven by the demand of the viewer and the viewer is demanding HD every day," said Shannon. Hockey, he noted, presents its own challenges to HDTV production in terms of camera positioning and blockage. Plus, hockey is the only major sport with a wall of glass between the game and the cameras much of the time.

"Everybody's aware that glass has to be cleaner," he said.

Given the longstanding complaint about hockey coverage—that it's too hard to follow the puck, and the screen

NHL, PAGE 31

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# Shedding Some Light on HD

## More or less? Vendors discuss tips for lighting

by Ken Freed

DENVER

Shooting video in HD requires fresh approaches to lighting and those who sell lighting gear to the trade are in a great position to hear about the latest tips and techniques.

"In the conversations we've had with our customers," said Duane Sherwood, director of communications for Lowel-Light in Brooklyn, NY, "we've found that the lighting adjustments fall into two areas, the amount of light you need and the way you light the scene."

Sherwood said the change in the amount of light needed for HD stems from the change in camera technology.

"If you look at the evolution of video cameras over the past 10-15 years, each generation has done better with less light," he said. "What we've found surprising is that the new HD cameras actually require more light."

The difference might be the higher resolution or the different circuitry in HD versus SD cameras, Sherwood said, "yet we've noticed that people shooting HD seem to add more lights now when before they'd been getting used to adding less and less, almost the point that overhead ambient light was enough in some cases."

Perhaps advanced lenses explain the shift, he said. In an effort to make HD video look like 35 or 70mm film, especially in made-for-TV movies, camera operators might add extenders to get a telephoto effect.

LIGHT, PAGE 36

*Lighting technician Michael Anamal offsets lighting for a recent demonstration of the new ARRI D-20 digital cinema camera at ASC in Hollywood.*

## Joost

CONTINUED FROM PAGE 1

Anton Dennisov, an associate analyst in media and entertainment with The Yankee Group in Boston, focuses on the broadband video sector. "This is the way to look at the media content that exists right now," he said. "Many people want a very small portion of content—about 30 seconds to a couple of minutes—like YouTube and about 200 similar sites."

Then come the viewers who favor more polished video production and longer-form projects of 20 minutes or more.

"Companies like Joost, Veoh and BitTorrent target this sector," Dennisov said, and deliver a TV-like experience to the PC screen.

Another key to the Joost business model is copyright protection for the content creators, said Maribel Lopez of Forester Research, also of Boston.

"If a user wants a really popular movie, like 'Casino Royale'—and many other people want it, too—the Joost model works," said Lopez, adding, "but it does not work with a less popular movie."

### BANDWITH AND A SERVER

But back on the upside, broadband TV also "offers mobility [with a laptop and a WiFi connection] and the consumers the option to time-shift, with content available on demand," Dennisov said, adding that it also facilitates niche content.

"A problem with networks is that it costs a lot of money to get shows on the air due to limited funding," he said. "But that is low-cost with Joost," as it requires only bandwidth and a server.

The service is not "in the traditional video value chain," and Dennisov said "that's the beauty of it. There is no longer any higher power (such as a network, program director or critic) to keep content off the air."

He added that garnering content from established content owners "is an interesting concept at the right time, because broadband penetration is about 53 percent now. Our research indicates that it will reach 74 percent by 2010."

But such companies also face several predicaments. "None are making any money right now, since they have a chicken and egg problem," Dennisov said. "They have to monetize through advertising and they need eyeballs to do that," noting that the average viewer watches 4.5 hours of TV per day, but only 1.25 hours of streamed content per month (with the average clip five minutes in length).

In addition, garnering venture capital can be a challenge. "But that scenario is improving," he said, "because the average person watched 15 streams per month in 2005. Today, the figure has risen to 67 per month [per viewer]."

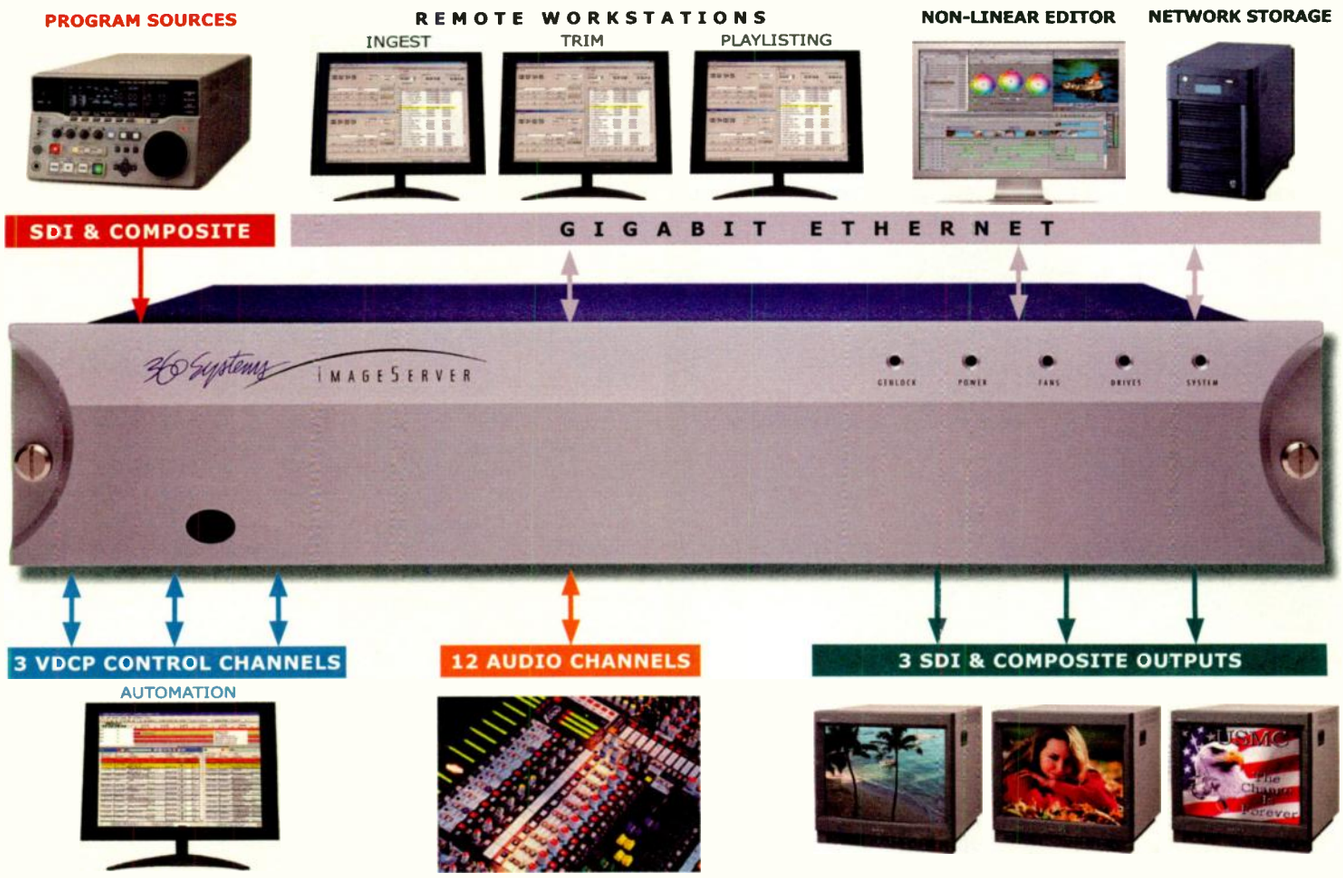
While Joost has the funding to operate for some time (after Skype sold for $2.6 billion), "this is about finding a way to make money," Dennisov said. He also wonders what the response of established corporations like Verizon and Comcast, which target such alternate revenue streams, will be. "The market is about ready for the technology, but it's still going to be an uphill battle."

Lopez pointed out that services such as Joost provide a next generation platform that will transition what "has been seen on the 'net to a 52-inch living room screen," she said. "This is about turning 'net TV into high quality TV."

There are three reasons that the right time for that to happen now, de Wahl said. "The technology is in place; the infrastructure of the 'net, which we see coming together right now; and most importantly, more content [is] moving online." ■

*(For more on Joost, read "Will Venice P2P Streaming Site Surge in 2007?" in Will Workman's latest "Inside Broadband" column, p. 42.)*

# Talk about intelligent design...

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## Audio

CONTINUED FROM PAGE 24

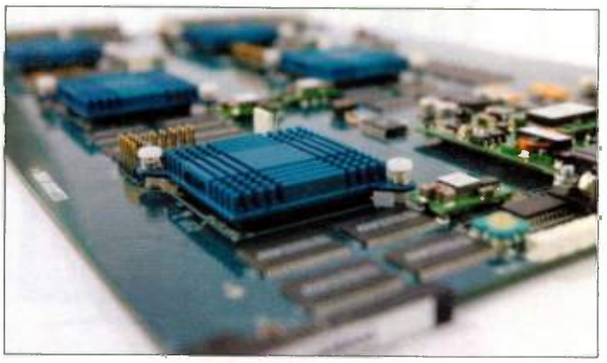
console, according to Blick.

Emmott from Calrec suggests that a customer ask for an unrehearsed demonstration of redundancy and hot-swapping.

"And while you're at it, turn off the power at random, and see how well and how quickly the board gets back to where it was," he said.

Grundstein from Logitek lists more features that customers are demanding: The ability to pass mono, stereo and 5.1; frame delay at the fader; lots of mix minus busses and the ability to reconfigure mix minus easily at the console; easily implemented IFB; lots of surface "snapshots;" blend capability at the fader for balancing field report audio; the ability to talk to various routers and storage devices; easily configurable aux busses and submasters; plenty of metering; and the ability to add capacity at a reasonable cost and without having to take the system down.

*Mike Giacalone, digital audio consulting engineer for Comcast SportsNet, with the SSL C100 console.*



*Calrec will demonstrate its Zeta console with Bluefin processing technology at NAB2007.*

Blick from Studer said that supporting a variety of input and output formats—analog, AES/EBU, SDI-embedded audio, MADI, and Dolby E—was important given the wide variety of devices that must be interconnected to the console.

Another factor is networking, between the console mainframe and one or more control surfaces, and networking among different mainframes, Emmott said.

"Ask whether networking is available and whether it has the capacity for growth," he said. "Networking can save significant costs on installation, especially if you have or may have multiple rooms and studio floors. It enables future development to be cheaper and more flexible."

In choosing the digital audio mixing system that's just right for any given facility, it's very important to get in front of the console to see how it feels from an ergonomic point of view, Wild said. Questions to ask are: how easy is it to operate? How fast can it be installed? Are there other users doing similar work who are happy with this same console?

"It's essential to talk with other users," Wild said. "Also ask, how good is your local support. How close is the manufacturer to your facility? Has the console proved itself over a period of time?" ■

# NHL

CONTINUED FROM PAGE 26

is too narrow to grasp the real flow of the action—the NHL sees HD as an opportunity to draw in new fans.

"We know it's coming and we know it's great for the sport. It will captivate the casual fan," Sannon said. "What HD will do is hopefully open the door a bit and get that casual fan to say 'wow!' And it's our job to keep them there."

## CHANNEL GUIDE

"Hockey Night in Canada" has been one of the CBC's top shows for decades, but south of the border, NHL has rattled around to most every network, appearing on Fox, ABC, ESPN, NBC, and, until 1970, CBS, before settling on its current United States partners NBC and Versus.

Also, serious hockey fans can catch the iN DEMAND subscription service, which holds out-of-market rights for most games.

Over the January All-Star Break, iN DEMAND upgraded a transponder so that it now provides (in cable systems that make the room) 14 channels of hockey where it used to show 10, according to David Asch, senior vice president of programming of iN DEMAND Networks, which is owned by a consortium of cable companies, including Comcast, Cox and Time Warner. With a maximum potential 15 games playing simultaneously, iN DEMAND can now show almost every one.

Since the lost season of 2004-2005, the subscription service has also showed one of those games each night in HD on a separate channel. There's also a real-time all-stats channel.

For those wanting hockey round-the-clock, the NHL Network has been cranking it out on digital cable in Canada since 2001. Owned by several partners including TSN (a Canadian sports network owned by media giant CTV), the NHL and others, the channel offered nine hours of All-Star Game coverage (the game itself was on Versus) and nightly news programs in addition to minor league and NCAA hockey, according to Andrea Goldstein, TSN director of communications. The package for the complete fan may soon be available outside Canada.

"Our intention is to bring the NHL Network to the United States," said Shannon. "We feel that the hard-core hockey fan in the U.S. would love the NHL Network. It's not matter of if, it's a matter of when." ■

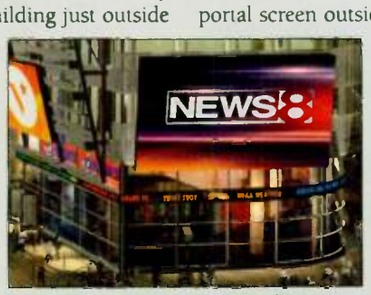
## WFAA Gives Fans an Inside View

DALLAS

The 2007 NHL All-Star Game was the league's first such showcase since the lost 2004-2005 season, in a city not known for its hockey passion.

"As an event in Dallas, it was fantastic," said John Shannon, senior vice president of broadcasting for the NHL, which last season saw many of its players in the Olympics during the midseason break. "Any stories about Dallas not being a hockey town are totally incorrect."

Local channel WFAA didn't broadcast the game, but it was barely a slapshot away. On Jan. 8, the Belo Corp. flagship opened its Victory Park Studio in a building just outside the American Airlines Arena, bringing pregame excitement to its live 5:00 p.m. and 6:00 p.m. news broadcasts and giving fans a view into the studio through its new glass walls.




*WFAA's new Victory Park Studio in Dallas gives pedestrians a closeup view of the station's news broadcasts.*

"With the studio right there, the thousands of people who were walking into the arena walk right by the studio," said David Muscari, vice president of product development for WFAA-TV and the Dallas Morning News. "We had reporters outside. There were hundreds of people staring into the studio as we were doing the newscast."

The festivities, in a city where pedestrian traffic is as common as icebergs, weren't by accident. Years back, when the league was considering the Dallas venue, one of WFAA's pitches was to show what local media could bring to the table.

"At the time, we didn't know that we were building this studio, but obviously the visibility they got was massive, and it was a result of being right there," said Muscari. "When you walk up to the facility, the first thing you see is this glittering studio on the corner."

The station got its first taste of what the crowds in that area would look like back on Dec. 10, when Dallas' marathon—called "Wellstone's Dallas White Rock Marathon presented by AT&T"—started nearby with some 30,000 runners, and WFAA broadcast live with a giant portal screen outside the nearly completed studio.

"I looked out, and I mean every eye was trained on this thing because we were broadcasting live," said Muscari. "You see that and it's very clear the sort of communal experience a facility like that can create."

The new studio is a part of the area's revitalization, which includes luxury hotels and other development near the arena. It's connected by fiber to WFAA's main studio, about a mile away.

"From an audience standpoint, to be able to just walk up and see local television being made, I just don't think you can underestimate how interesting and exciting that is," said Muscari.

*Sanjay Talwani*

# SMPTE Showcases Video Over IP

## Broadcasters get updates on new video transport technologies at SMPTE/Vidtrans

**by Wes Simpson**

ORLANDO, FLA

IP has emerged as a mainstream application for professional video, as evidenced by the papers and demonstrations at last month's annual SMPTE Digital Content Connection & VSF VidTrans Joint Conference.

In addition to new standards, video over IP technology was displayed and discussed at most of the booths and the subject of many of the papers. These discussions are no longer theoretical—broadcasters are starting to deploy video over IP for contribution, distribution and direct to consumer applications.

"Anyone who was skeptical about broadcast-quality video transport over IP had to come away from this conference with the realization that this technology has been embraced and is ready to go to air," said Paul Atwell, director of video networking for Ion Media Networks, formerly Pax.

*At the SMPTE/Vidtrans Interop, monitors show impairments and how they were corrected to demonstrate how manufacturers handle forward error correction.*

### INTEROPERABILITY TESTS

Broadcasters are coming to recognize that many different things can happen to their pristine video signals when they are sent over an IP network.

In response to these concerns, the conference hosted a COP3 interoperability test, which took place on the exhibit floor.

The (now-inactive) Pro-MPEG forum developed the standard that is known as Code of Practice 3 Release 2, or COP3-R2. This work has now been taken over by the the Video Services Forum (VSF) and SMPTE,

SMPTE, PAGE 34

## Emulates

CONTINUED FROM PAGE 10

message will penetrate down to consumers.

**TV TECHNOLOGY:** What are your goals?

**COLLEGIO:** The central goal of the campaign is to make sure that no television set goes dark in February of 2009 due to a lack of information about the DTV transition. Some consumers may allow a TV set to go dark. But our goal is to make sure that everyone has the information they need to navigate the transition.

**TV TECHNOLOGY:** What is your idea of digital versus analog technology?

**COLLEGIO:** It's as big as the switch from black-and-white to color. The possibilities opened up by digital for a broadcaster to send multiple program streams simultaneously, coupled with the spectacular picture quality of HDTV, make this a key moment in the history of television and technology. Coming from a political background where we run aggressive campaigns, I couldn't have dreamt up a more interesting private sector campaign to run than this one.

**TV TECHNOLOGY:** What do you believe instigated the digital transition?

**COLLEGIO:** The DTV transition was launched as a public-private partnership between government and broadcasters to ensure that Americans would have access to the highest quality programming and best television technology the world has ever seen.

Broadcasters have done a phenomenal job shepherding this transition through many difficult challenges. Our goal now is to finish the job, keeping in mind that no consumer should be disenfranchised from access to broadcast television signals as part of the process.

**I couldn't have dreamt up a more interesting private sector campaign to run than this one.**

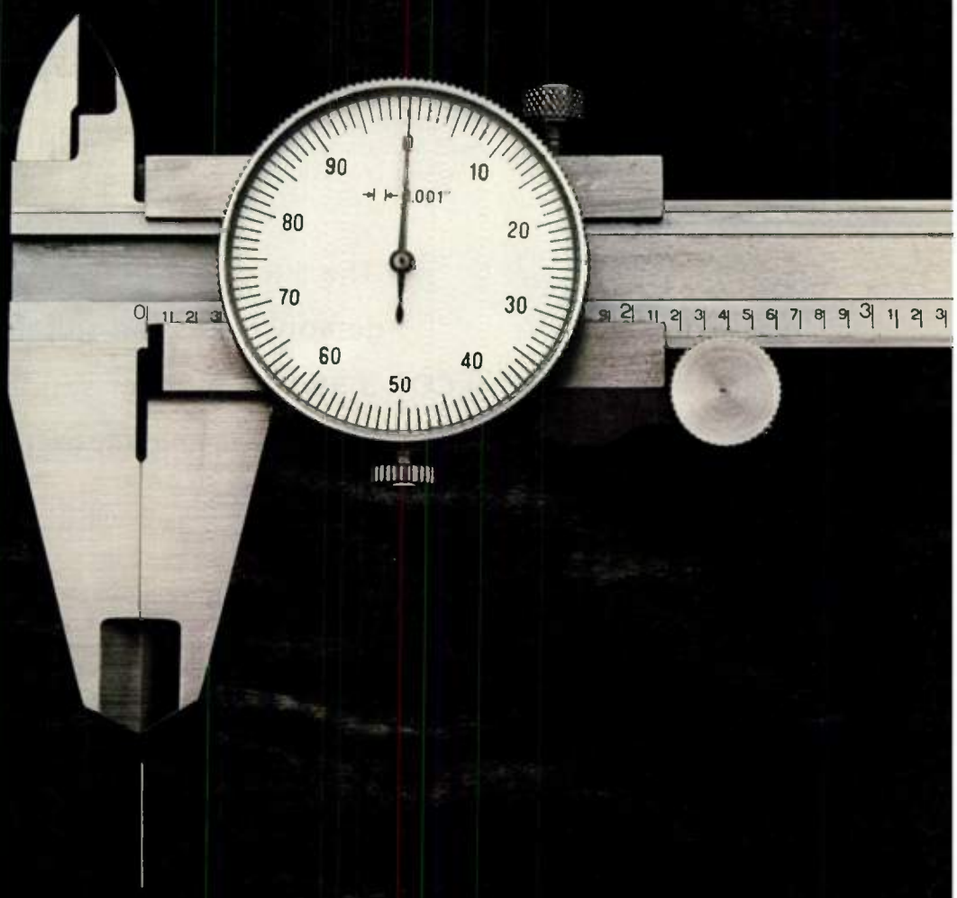
**TV TECHNOLOGY:** Do you know what Freeview is?

**COLLEGIO:** Of course! The free, OTA digital service provided in Britain—although it's all in standard definition, whereas DTV in America can include high-definition broadcasting. From 2008-12, the entire U.K. will switch over to DTV, and I am visiting with some of the folks handling the U.K. transition in London later this month. (*Editor's note: January.*)

**TV TECHNOLOGY:** What is the difference between a cable network and a broadcast network?

**COLLEGIO:** Broadcast networks send their signals to local stations, who send it over the air to consumers for free. Cable guys send their programming to local cable monopolies, who then send it over wires to consumers for a fee.

I prefer the free kind.

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# SMPTE

CONTINUED FROM PAGE 32

and designated SMPTE 2022.

In the project, an independent jury evaluated the ability of each participating exhibitor's encoder to create a stream that could be correctly decoded by every other vendor involved in the interops. Controlled errors were injected in the interconnecting network to exercise the error correction capability of the added forward error correction (FEC). In all cases judged by an independent jury, including this reporter, all of the injected errors were removed and a clean video signal was produced. The five vendors (Harris, Grass Valley, Tandberg Television, Path One and T-VIPS) supplied FEC encoders and decoders based on COP3-R2.

A total of 20 tests were performed using video source material supplied by Fox. Each vendor took the compressed video stream used in the test and ran it through its COP3-R2 encoder, which added FEC packets to the video stream. The outputs were then sent to a network impairment device that simulated a network that had a high enough error rate to completely test the error correction limits of COP3-R2. The impaired streams were then delivered to a decoder in each booth which was responsible for using the FEC data to completely correct the compressed video stream, and then delivered to the display stand for viewing.

"The success of this interop clearly demonstrates the suitability of the COP-3 R2 standard for sending high-quality video streams over an IP network experiencing a high error rate, and the momentum within the broadcast community for supplying this equipment," said John Dale, senior product line manager for Milford, Conn.-based Media Links, a subsidiary of Japanese digital broadcast equipment supplier Media Global Links, and co-chair of the ad-hoc group that hosted the testing.

The interop demonstrated the ability of the COP3 algorithm to operate in the presence of an abnormally large amount of network errors. It also demonstrated that the specification could be understood and followed by a number of competing vendors; no mean feat considering the number of different aspects of the signals that needed to be specified.

In addition to the tests, a number of papers presented at the conference discussed forward error correction. Thomson and Digital Fountain explained how adding a small amount of FEC data to a video stream can allow the receiver to completely recover from a number of errors ranging from simple bit errors to entire lost packets. This process can be tuned, allowing more FEC packets to be used when error rates are high, and less packets when the error rates are low. With the ease and flexibility of FEC, it's hard to imagine why broadcasters would even consider sending high-quality video over an IP network without some type of fairly serious error correction to protect their signals.

## THE LEGAL ANGLE

A panel discussion led by Brad Gilmer, president of technology consulting firm Gilmer & Associates, explored the conflicts between content owners and content consumers. Some panelists took a hard line, saying that consumers shouldn't think that they own the music on any of the CDs that they bought—they merely own the rights to listen to the performance contained in that CD, which may not include the right to copy the CD or transform it into another form, such as an MP3 file. Others, while not quite so emphatic, were also concerned about protecting the rights of content owners and making sure that consumers don't have the temptation to violate copyrights.

Watermarking, the practice of inserting hidden data inside a digital video or audio stream to give it a unique identification number, was also discussed. Some content providers view watermarking as a solution to digital piracy, enabling content owners to specifically identify when and where copies of content originated, simplifying the process of prosecuting violators. Unfortunately, as Reza Rassool from Widevine pointed out, the processing load to create a unique watermark for each viewer can be staggering unless properly distributed in the distribution network.

**"The success of this interop clearly demonstrates the suitability of the COP-3 R2 standard for sending high-quality video streams over an IP network."**

**—John Dale, Media Links**

## TAX DOLLARS AT WORK

Dr. Michael Isnardi of Sarnoff Corp. in Princeton, N.J., gave a fascinating presentation about the work that he has been doing with AT&T, Thomson, and Alcatel on the Video Enhanced DSL (VeDSL) project funded in part by the U.S. Government. The project is designed to explore and demonstrate technologies that would allow a standard 1.5 Mbps DSL circuit to handle two SD program streams simultaneously. To do this, researchers needed to create some significant advances in technology including:

- A reduction in bit rates of acceptable quality video to 0.07 bits per pixel, representing a threefold improvement over MPEG-2 and a significant improvement over MPEG-4 AVC;
- Development of a video-aware DSL Access Multiplexer (DSLAM) that can selectively drop IP packets in a network overload situation to negatively affect the video stream; and;
- Creation of a fast channel change system that would eliminate the one to two second delays found in many digital satellite and CATV services.

In developing fast channel change, researchers discovered that using a low-resolution video image with a short GOP compressed to a couple of hundred kilobits per second resulted in a much quicker channel change scheme. Whenever a user decides to change a channel, this stream is delivered to their set-top box, and upconverted for display on the television. This continues until an I-frame arrives on the standard-definition stream and the signals can be spliced back. This low-resolution stream can also be use for picture-in-picture applications by the consumers' set-top boxes.

"The Video-Enhanced DSL system offers a compelling suite of compression, congestion management and fast channel change technologies that keep end-user quality of experience high without the added expense of over-provisioning network resources," Isnardi said. "The team of Alcatel, AT&T Labs, Sarnoff Corporation and Thomson Corporate Research look forward to furthering the adoption of these technologies within the IPTV industry." ■

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## Lighting

CONTINUED FROM PAGE 28

"When you add extenders, you need to add more light to compensate for what the extra lens elements are doing," he said.

Regardless of the reason for needing more light, Sherwood said Lowel is seeing an increased demand for stronger fixtures with higher multiwattage lamps. "You need more flexibility with HD than with SD because the higher sensitivity of HD makes errors like stray light much more noticeable."

Sherwood said HD is also improving the craft of lighting.

"I'm very excited about this," he said. "Just like in woodworking or any creative endeavor where your individual sense of craftsmanship sets you apart from your competitors, so every good lighting director creates a unique style and look."

With HD, he continued, "you now can use light more like in film by really paying attention to the details. You can create a sense of depth with so much more gradient of shade in the image that you almost get a 3D effect. It's like the difference between an old computer Web browser with 256 colors and a new browser that can display millions of colors."

The opportunity for greater craftsmanship is most apparent with TV programs and made-for-TV movies, Sherwood said, but local news shooters also need to refine their lighting for HD.

"You need to be sensitive to the subtleties of the image your camera will show," he said.

A slightly different view came from Gilles Galerne, president of K 5600 Lighting in North Hollywood, Calif.

"Aside from the obvious fact that the new format of 16:9 requires a larger or wider area to be lit, lighting for HD is not fundamentally different than lighting for SD, whether it's a broadcaster's shoot or a production shoot."

Broadcasters usually are satisfied with the lighting they have on a subject, he noted, but when HD is used to replace 16 or 35mm film, then a more "contrasty" film-like look is required.

"From this we can deduce that any camera operator called for both styles of production needs to have equipment that adapts to each kind of shoot," Galarne said.

Versatility and ease of set up for the lighting kit is paramount.

"In one day, you can shoot a stand up interview where maximum raw output is needed to fight the sun, then you'll be doing a beauty shot for the primetime magazine," he said. "The next day, you might be faced with shooting a drama or comedy piece where you must combine the roles of director of photography and chief lighting technician. Choices have to be made, and your equipment has to be ready to fulfill all duties."

The type of shoot determines the lighting choices, according to Gary Thomas, national sales manager for Videssence of El Monte, Calif.

"I've noticed our HD customers requesting softer light for their aging news anchors who want to hide as many imperfections as they can."

At the same time, he said, "more and more news sets are installing light in the desk itself to illuminate under the chin. This has been done for years, but HD really shows up the need for dispelling that chin shadow, and this is most obvious with aging talent."

A former lighting director at KDKA-TV in Pittsburgh, Thomas said that angles of light are much more critical in HD than SD, especially when working with multiple cameras.

"You need to match those shared details in the background and in shadow that show up from different camera angles," he said.

As a consequence, he said, "we're getting a greater demand for portable lighting kits because field equipment is being used in the studio to get full spectrum lighting from all angles for multicamera shoots. Nothing is worse than getting into the editing room and discovering that the same shot from different angles does not have the same lighting."

A related issue is having full coverage of the wide-screen image area.

"HD news sets have to be lit to cover the entire desk with people spread out across the frame. Your lighting must extend to the outer boundaries of your wide shot's image area, too, so you might want to use filters that diffuse light at the outer edges of the set."

Thomas said the most useful high-intensity lamp for HD lighting is HMI.

"The new HMI lamps have lightweight ballasts, so they can be small enough to mount on a camera or carried around in a portable kit," he said.

> **"I've noticed our HD customers requesting softer light for their aging news anchors who want to hide as many imperfections as they can."**
>
> **—Gary Thomas, Videssence**

### POWER UP

Improved batteries also are critical for HD lighting, said Jim Crawford, president of Frezzi Energy Systems, a division of Frezzolini Electronics in Hawthorne, N.J. "The new HD cameras and lights require tremendous energy efficiency, so we're seeing a big demand for advanced lithium batteries that support maximum shooting time and stronger lighting, especially when shooting with a 200 watt HMI mounted on your camera."

Crawford affirmed that multiple light angles are increasingly crucial.

"We have customers placing HMI lights all around a subject to get proper illumination, including backlights and keylights, which is relatively new with HD compared to SD," he said.

HD cameras tend to compress the contrast range, said Frieder Hochheim, president of Kino-Flo in Burbank, Calif.

"So unless you want your anchors highly defined, softer light seems to render faces better on HD than hard light. I can guarantee that from the viewpoint of the anchors, especially the aging anchors who freak out when they first see themselves on HD, they want softer light that eliminates some of the contrast," he said.

The trick to handling contrast in HD, Hochheim said, is to "maintain proper control over highlights and shadow detail. To get the skin tones right, I suggest you shoot some bracketed tests at different exposures with a highly textured surface like burlap on one side of the face and an 18 percent Kodak grey card on the other... If you don't have time to shoot some tests to adjust your lighting, use a spot meter on highlights and shadows, and set your exposure somewhere in the middle."

Hochheim also advised staying within the color parameters of your lighting.

"Know the color range of your camera and correct your balancing accordingly. If you're mixing daylight and tungsten, for example, wrapping something blue around your subject will make color balancing easier," he said. "If you have high contrast in the background, unless you are shooting sports where you want every detail to show, focusing wide open on your subject and using a shallow depth of field may help. Of course, all these are very subjective calls. Your own tastes must determine your lighting." ■


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DIGITAL TV | Charles W. Rhodes

# More Examples of Interference From Unlicensed Devices

The IEEE Consumer Electronics Society celebrated its 75th anniversary at the International Conference on Consumer Electronics in January, along with the Consumer Electronics Show in Las Vegas.

I presented two technical papers: "New Challenges to Designers of DTV Receivers Concerning Interference" deals with the recent FCC actions to allow unlicensed transmitters to operate in terrestrial broadcast spectrum. Readers will recall my dire warnings about a resulting digital citizens band arising Feb. 18, 2009 when the sharing begins.

Broadcasters and DTV designers need to be aware that while the strongest DTV signal—desired (D) or undesired (U)—will be about –5 dBm at the receiver input from a transmitter five miles distant, much stronger signals may be received from unlicensed transmitters operating in first adjacent channels. In other words, the protection ratios the FCC developed from for DTV-DTV interference will not protect viewers from this new kind of interference.

Those protection factors took into account the location of DTV transmitters, but the location of digital citizen band transmitters will be unknown. DTV receivers will be subject to additional forms of legal interference. If it is legal, it cannot be "harmful," or can it?

The accompanying figures here deal with one, two or three undesired 6 MHz signals on TV channels, all at the same power. There are no desired signals shown because I want to illustrate the intermodulation—or IM—products these undesired signals produce in an overloaded receiver. Each signal is close to 0 dBm, so they produce lots of IM and spread it over a number of channels.

## RECEIVER OVERLOAD

Fig. 1 shows one signal filling channel (n). This could be a DTV signal or an unlicensed signal. Note that the IM spills over into both (n-1) and (n+1) where the 'noise level' is –43 and –45 dBm.

Fig. 2 shows the same signal on both channels (n-1) and (n+1). Note that there is IM on channels (n-4) and (n+4) at –40 dBm, and more IM on channels (n-3), (n-2), (n), (n+2) and (n+3) each at about –34 dBm. This is spectrum spreading of the IM.

This has been shown in previous columns and in a paper I co-authored with Gary Sgrignoli in "IEEE Transactions on Consumer Electronics" May, 2005. This spectrum spreading is being studied more closely here.

Fig. 2 demonstrates that a pair of strong signals on two channels can cause interference to reception on any of seven channels nearby. Either or both of these can be a DTV signal, or from an unlicensed transmitter.

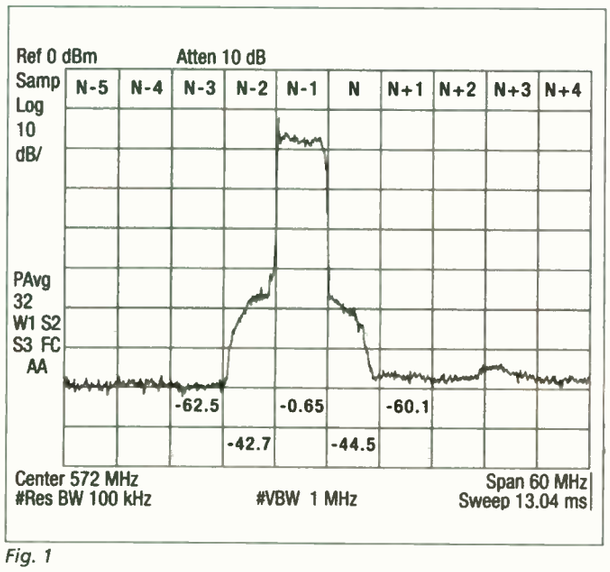


Fig. 1

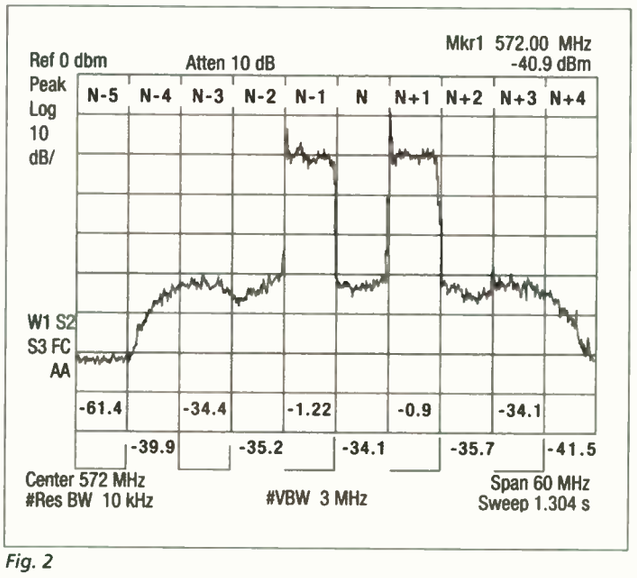


Fig. 2

Broadcasters may be unconcerned about their digital coverage now, but that may change in 2009 when those will be the only signals in operation. All these channels can be jammed by two unlicensed transmitters.

As this column has noted, the IEEE Working Group 802.22, which is working on a protocol for unlicensed transmitters, does not think these devices should operate on a first adjacent channels. However, the FCC doesn't have to agree.

Opening first adjacent channels would be impractical not merely from the DTV interference standpoint, but because of radiated IM. Think of it this way, a DTV transmitter may radiate up to 1 megawatt (30 dB above 1 kW) of power in its allocated UHF channel. It is also radiating about 36 dB less power in each first adjacent channel, so the power in each adjacent channel is 6 dB below 1 kilowatt.

How can a base station with an ERP or 2.4 watts serving as an entry point to the Internet be heard over the noise

INTERFERENCE, PAGE 40

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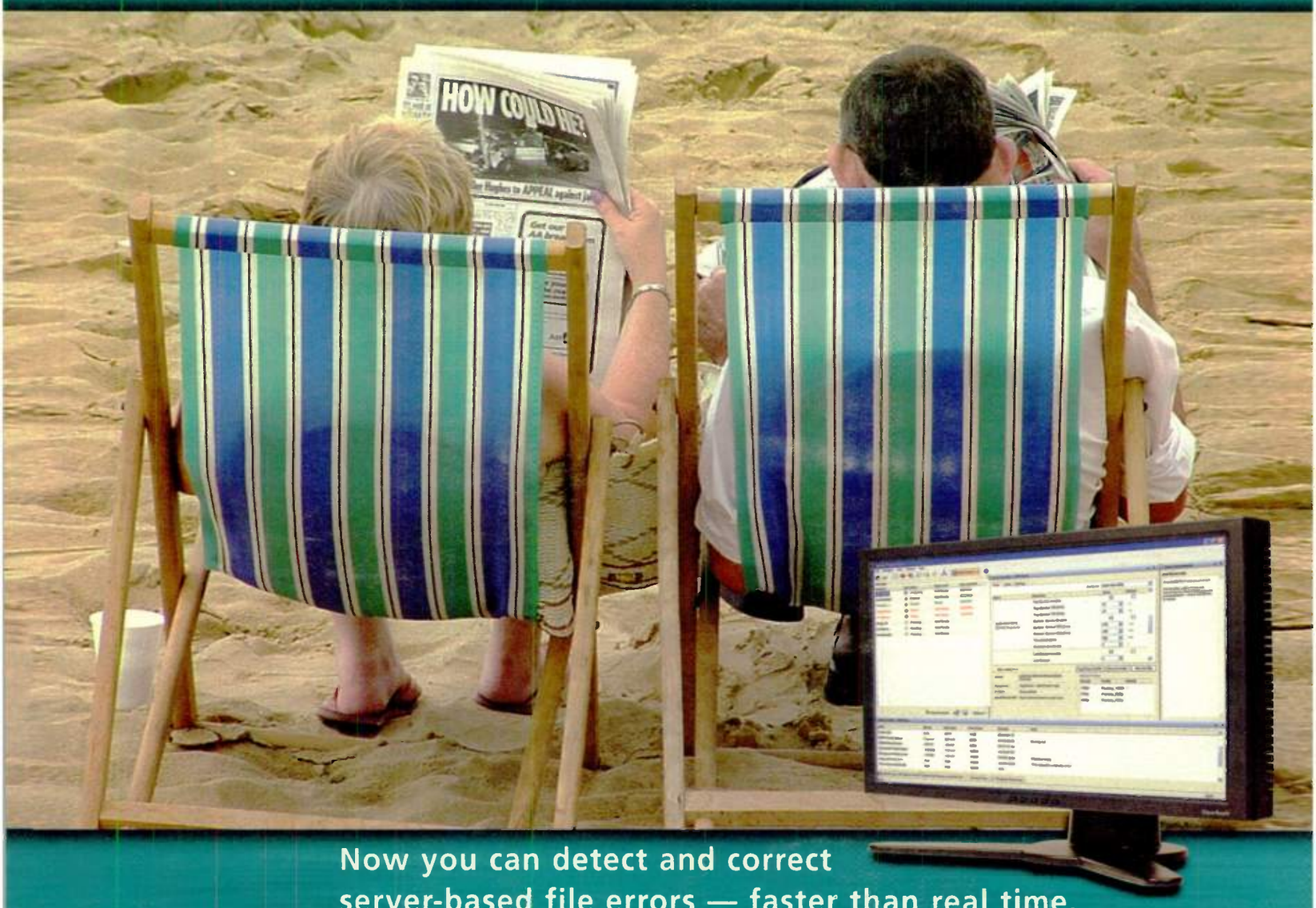


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# Interference

CONTINUED FROM PAGE 38

in the channel? How can anyone with an unlicensed transmitter be heard in this community?

Fig. 3 shows a pair of signals with two channels between them. The familiar IM on both first adjacent channels is seen, but now there are clusters of other IM products below the lower channel and above the higher one. These are IM products generated between the two signals. If either signal is removed, both of the extra cluster vanish, too.

Suppose there is a DTV signal on one of these channels, and an unlicensed transmitter signal on the other. Spectrum spreading will produce a plot as in

INTERFERENCE, PAGE 43



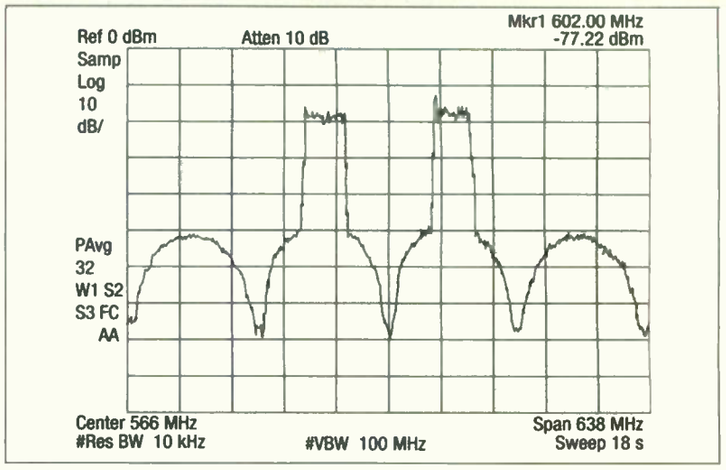



Fig. 3

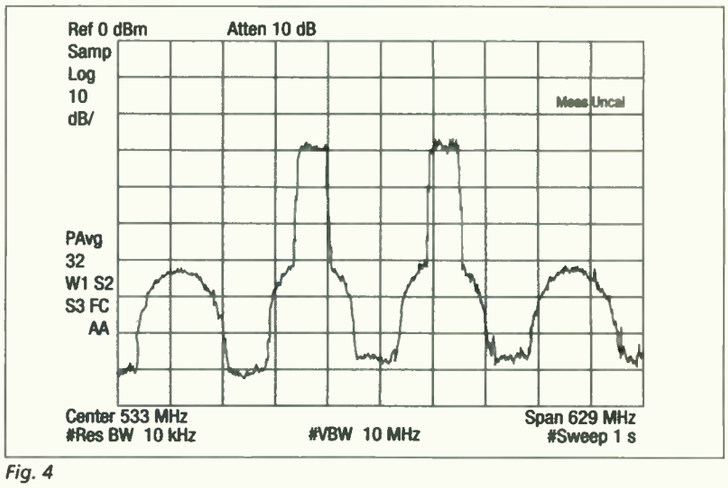



Fig. 4

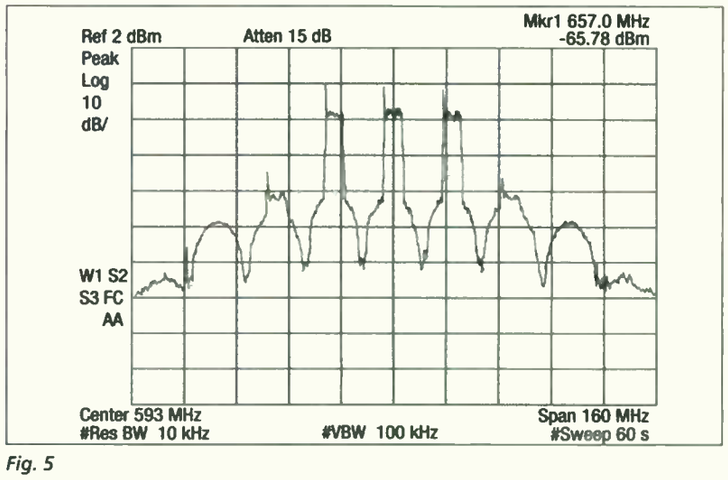



Fig. 5

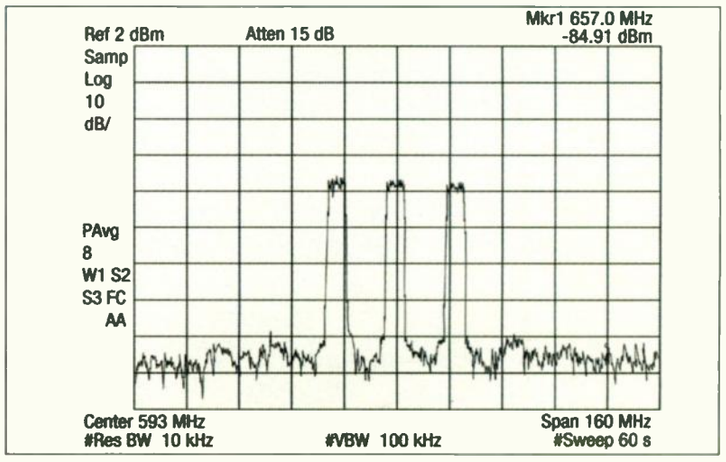
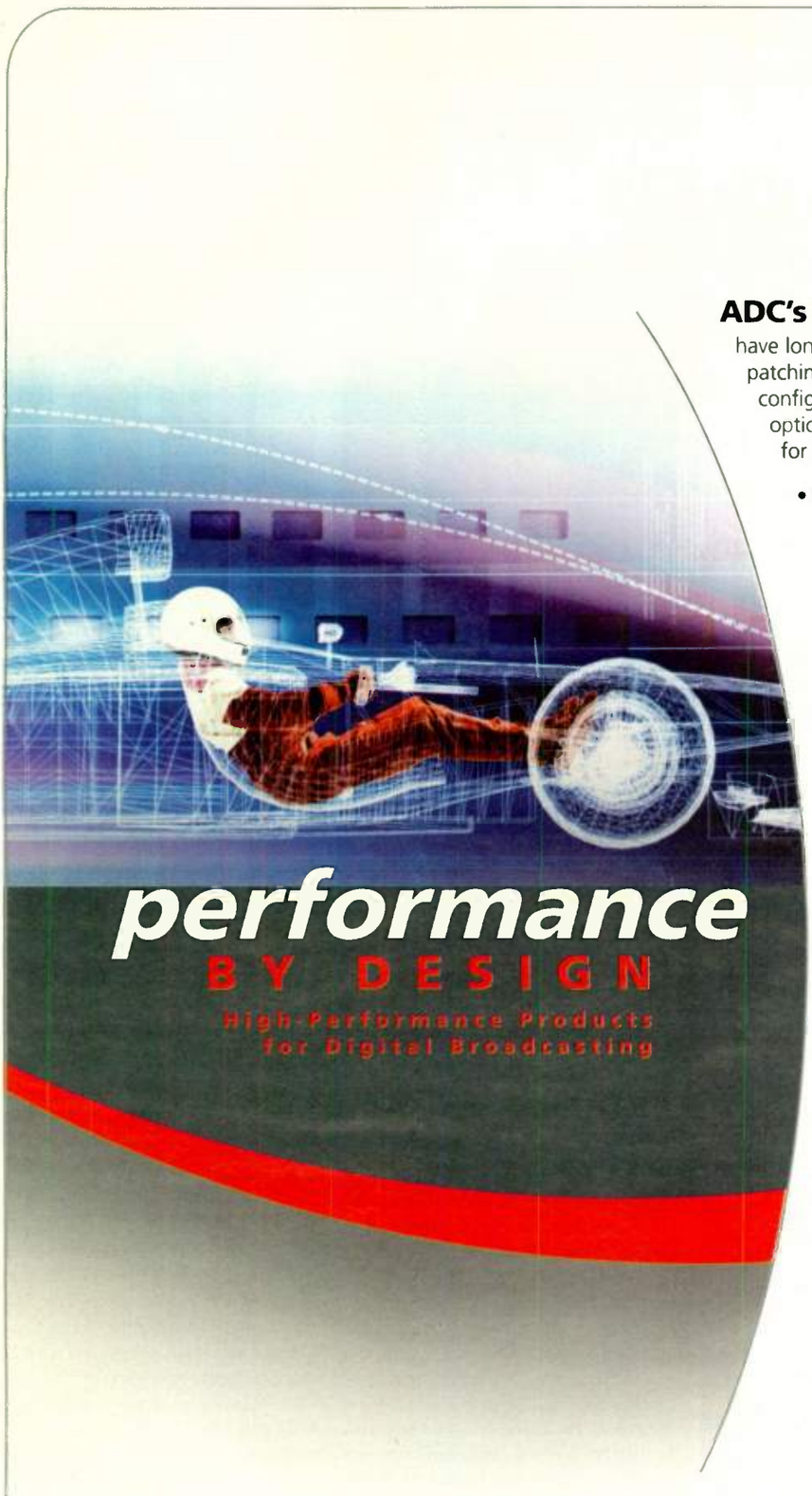



Fig. 6

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INSIDE BROADBAND | Will Workman

# Will Venice P2P Streaming Site Surge in 2007?

Why stop at a 10-minute online video when you can produce and distribute your own channel?

That's the reasoning behind the latest contender for broadband video supremacy from the same P2P wizards who brought us Kazaa and Skype.

Dubbed Joost (code-named The Venice Project during development), it's already generated breathless buzz from developers, media insiders and analysts as the venture that may finally achieve the long-awaited breakthrough in Web-based video distribution.

Its founders are counting on the cost-effectiveness and efficiency of P2P networks to stream long-form, high-def video, whether from individual or corporate sources, to eager viewers weary of the clunky, amateurish, short-form videos already available on YouTube and other sites. The Joost game plan breaks down into strategies to please each of their three core constituencies: users, content providers and advertisers.

To wow audiences, Joost proposes making the video experience one of ease, quality, personalization and community. Users can build their own channels, tweak shows while using DVR-type controls, communicate with others using Skype conference calling, and share playlists within their social network. Sort of an integration of MySpace and YouTube, both of which, by the way, are of course working towards this very goal themselves.

**Letting a bunch of code freaks loose on your software can yield radical, addictive enhancements.**

Joost founders Janus Friis and Niklas Zennström have strong ties with the open source community, which will provide one major key to the development of Joost's wow factor. Letting a bunch of code freaks loose on your software can yield radical, addictive enhancements. Widescale beta-testing only began late last year, so it's too early to tell what these features might be.

Content owners worried about copyright protection will be assuaged by the security inherent in streaming. Joost execs are quick to emphasize that though it employs peer-to-peer technology, it is not a file-sharing service like Kazaa. Streaming will ensure "the highest standard of encryption" within Digital Millenium Copyright Act strictures, they say.

Finally, there's the business model, which counts primarily on targeted advertising to allow providers to monetize their content. How much advertising this targeted audience will take remains uncertain.

A primary reason for all the Joost hooplah is simply the founders' pedigree. Friis and Zennström scored their first P2P success in Kazaa, selling out to Sharman Networks just as the latter became embroiled in a lawsuit from content providers.

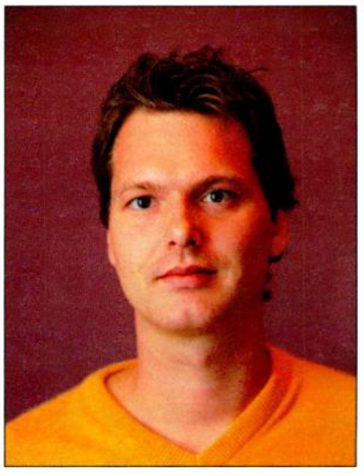
In 2003, the duo founded Skype, capitalizing on the growing bandwidth potential for VoIP. They sold Skype last year to eBay for $2.6 billion in cash (plus another $1.5 billion in bonuses). How eBay will tie in to Joost (Friis and Zennström are still on board) remains another mystery sure to unfold in the coming months—though beta testers have already spotted eBay ads.

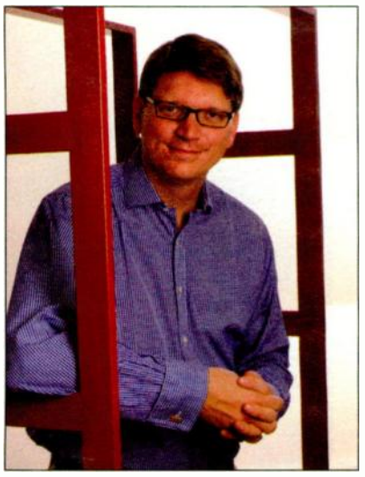
While the plan sounds good, the venture already faces some stiff competition and other hurdles.

Major video content providers certainly seem to be accepting the inevitability of Web-based distribution—in contrast to their music peers over the last decade. They've already seen several spectacular cases of Internet distribution boosting TV viewing levels and vice versa. For example, ABC has trumpeted its 12 million streamed episodes of shows like "Lost" and "Desperate Housewives."

But the big TV networks and their parent conglomerates all have their own Web distribution of free programs or other Web video distribution ventures they're backing. Along with independents, including BitTorrent, Brightcove and Video Egg, one of these, Veoh, already employs a P2P model and has backing from Time Warner and former Disney boss Michael Eisner. Another, Akimbo, has already introduced its own box, a VoIP syndication player.

Meanwhile, Apple's iTunes offers episodes from more than 150 TV programs, and Steve Jobs is certainly not going to sit on the sidelines of this fray knowing the logical evolution of the iPod is towards video and communication.





*Before Janus Friis (L) and Niklas Zenström (R) founded the Venice Project, they developed and sold P2P network Kazaa, and VoIP service Skype.*

## BOTTLENECK BUGABOO

The ever-present bottleneck bugaboo also looms. If every U.S. broadband user suddenly started streaming video, networks would clog. The question is whether capacity can keep up with demand; so far that's been the case, but analysts warn streaming video represents a quantum leap in bandwidth usage.

Finally, there's the simple but potentially massive hurdle of human passivity. To date, no video distribution model other than Netflix has been able to make inroads into viewers' desire to sit on their collective fannies and exercise their thumbs. Unless Joost plans to integrate with DVR manufacturers and suppliers to ensure that Web-delivered video winds up on DVR platforms, it will never attain the convenience attractive to most viewers.

But that approach runs counter to the socializing and community elements of the founders' strategy. They want streamed channels that are customizable and "mixed with all the wonders of the Internet."

Sound like a wonderful way to "fix" TV, as they say. But I'll have to see how the fixes work before I'll be convinced. And whether passive viewers will want to engage with all that Internet interactivity remains a dubious proposition.

*Will Workman is a former editor of telco industry publications Cable World and MediaView. He is now working on his Ph.D. in mass communications. He can be reached care of TV Technology.*

## Interference

CONTINUED FROM PAGE 40

Fig. 3, and any of six TV channels may be jammed by this combination of signals. Two unlicensed transmissions could produce the same results. Note also that in Fig. 4, there are vacant channels between the occupied channels. Note also the increased spectrum spreading in Fig. 4. Ten channels have IM.

It is convenient to think of pairs of signals causing interference, but there are many cases where three or more U signals can intermodulate as shown in Fig. 5.

The IM is produced in the receivers. If the RF amplifier gain were reduced by 20 dB, or the RF signal attenuated by 20 dB, these IM products would vanish as shown in Fig. 6. All three signals could be received if the overloading shown in Fig. 5 ceases.

I have suggested that the low VHF band be re-allocated to unlicensed transmitters. By isolating these devices in a band of their own, the interference problems would be solved. As matters stand, those 40 or so broadcasters seeking a DTV allotment in the low VHF band are in for a shock when they find out how little coverage they actually have.

Their only solution is to request a substantial increase in power. If they get this power increase, whatever economic advantage they sought in seeking a low VHF channel will be lost. Has anyone told them? Will they get their power increase? Why not put it to the FCC?

Then there is the matter of broadband over power lines. I sure wouldn't bet the BPL threat to the low VHF band will simply go away. If BPL doesn't interfere with DTV reception because the signal is carried conductively over power lines, why should it be incompatible with unlicensed transmitters radiating elsewhere in the low VHF band? Perhaps the BPL folks should populate the lower portion of the band first, and unlicensed transmitters from the top down.

### RECEIVER DESIGN

Recently, I've been studying ways to design receivers to operate with up to –5 dBm of U signal power present. I think I've come up with a way to do it and that will be the topic of one of my ICCE papers. My concept kicks in at D = –48 dBm. What about the viewers in the DTV fringe area?

Viewers receiving DTV at –70 dBm are now protected against adjacent channel interference by the FCC DTV planning factors. If a station is received at –70 dBm on channel (n) inside the station's coverage area, there won't be any other DTV signal on channels n-1 or n+1 above –42 dBm ( D/U = –28 dB).

But what about one or more unlicensed transmitters on the same block, which may put –14 dBm into nearby receivers. What about more than one unlicensed transmitter in the neighborhood? I see no way to avoid jamming in weak signal areas where the RF amplifier must run at maximum gain to capture the desired signal more than 15 dB above the noise generated in the receiver's mixer.

My other topic was "Non-Invasive Testing Methods to Determine the RF Performance of Consumer DTV Receiving Appliances."

My plan involves testing with two undesired DTV signals. My undesired DTV signals include sideband splatter akin to that of real DTV transmitters. My desired DTV signal is a real-life signal received with a log periodic antenna over a 13-mile, direct-ray path and amplified up to –5 dBm without measurable sideband splatter.

These tests cover the entire range of desired signals from –84 to –5 dBm measured in 5 or 10 dB increments. Once it is determined how two undesired DTV signals affect a receiver, further testing of one specific undesired signal can be readily carried out.

*Charlie Rhodes is a consultant in the field of television broadcast technologies and planning. He can be reached via e-mail at* cwr@bootit.com.

## FOCUS ON EDITING | Jay Ankeney

# Creating Sports Editors

From the X Games to World Championship Darts in primetime, as this month's Super Bowl XLI demonstrated, sports programming is becoming an increasingly important part of the TV schedule. But who is hatching the next generation of sports editors? Building a career in that specialized niche of our business takes more than just knowing how to place clips on a timeline.

Editing sports shows takes a sense of dedication to the craft along with a gut instinct for what makes creating sports shows exciting. I've been recently impressed with the success of the Florida State University Seminole Productions program in preparing students for sports editing careers.

The largest source of sports broadcasting in the United States is ESPN, which is now responsible for all ABC Sports broadcast operations and programming.

"In all of our production operations, we are always scouring the country for good schools that are keeping up with industry trends," says Mike Boissonneault, senior director of ESPN production operations. "About two-thirds of our new hires each year come from schools with programs that prepare their students for the type of demands a 24/7 sports operation requires, and Florida State University is one of the schools we look at every year. The director of Seminole Productions, Mark Rodin, prepares his students not only for what we need but for what is in demand from the whole industry."

Recognizing that there are many fine film/video schools in this country, few have the reputation of the College of Communication Media Production Program at FSU, and especially their Seminole Productions department.

As Rodin explains, the college currently has 48 edit suites of which 14 are dedicated to Seminole Productions where they produce material for Seminole sports teams. This includes both Avid Media Composer and Apple Final Cut Pro editing seats, all being fed by a 10 TB EditShare central storage system.

Often working 'round the clock, these NLEs are used to create more than 100 weekly sports magazine-style shows each year for regional cablecasts; 50 Internet streaming sports events; highlight tapes for the coaches; and the flashy fan-rousing material that goes on FSU's various stadium video boards.

As a result, instead of cramming through a purely academic curriculum, the editing students at Seminole Productions do most of their work on a client basis serving other FSU departments and often state agencies from the outside.

"The money we generate often goes to expanding our facilities," Rodin said, "but most importantly, it gives our students the real-world experience with deadlines and client pressures. A majority of our shows end up on the Fox Sports affiliates that can be seen throughout Florida."

> **"The director of Seminole Productions, Mark Rodin, prepares his students not only for what we need but for what is in demand from the whole industry."**
>
> **— Mike Boissonneault**

Tyler Ginter is one of the students who has taken maximum benefit from the Seminole Productions program at FSU. Every year for their Homecoming Weekend, FSU produces a $250,000 multimedia, multicamera event called Pow Wow that is broadcast live to the FSU basketball arena. In 2006, Ginter not only edited many of the packages in the presentation, but actually was the studio producer for the whole show.

"My co-producer Nick Rivero was cutting packages on Final Cut Pro while I was editing with an Avid Media Composer, all accessing the same files on the EditShare server, and after some 90-hour weeks, the show went off flawlessly," Ginter said. "But the result was also an elaborate production that I can show to prospective employers once I graduate. I couldn't have had that experience at many other schools."

A recent graduate, Lesroy Louard, credits FSU's Seminole Productions for helping to launch him into a professional career in video. Louard, who now has his own DarKman Productions company outside of Atlanta, spent two years as an Avid editor on "Atlanta Tonight" for the local UPN station, and is currently cutting sports material for Career Sports & Entertainment.

"As an editor, Mark Rodin's classes taught me editing from top to bottom," Louard said. "It gave me the credibility and confidence I needed to build a resume along with the practical experience required to present myself as a total package to professional companies here in Atlanta. It was an awesome experience."

## LATE ARRIVALS

This professional outreach also extends to major media centers on the West Coast, and far beyond the sports arena. Among others, FSU graduate Jamie Linden's screenplay for "We Are Marshall" brought the passion for sports to feature screens in December. That was helped in part by the LATE (Los Angles Television Experience) program, run by FSU Associate Professor in Communication, Bob Pekurny. Every summer, Pekurny takes a dozen students on a field trip to Hollywood for 13 weeks of interviews with the likes of director Garry Marshall (whose contracts often reputedly include a basketball court on his film locations) and internships at TV stations and major studios.

Once these students have their parchment in their hands, many of those production companies are willing to open their doors to them. Marcos Gabriel, creative director at Burbank's Toy Box Entertainment, says, "I know the FSU program and have sometimes interviewed students just based on Pekurny's recommendation. We recently hired an applicant who had come out to Los Angeles as part of the LATE program because we know a graduate from FSU will have the background we need."

This process of hatching video professionals in general and sports editors in particular from FSU's Seminole Productions curriculum has produced enviable results. Pekurny estimates that upwards of half of the students who want to be on a professional career track actually end up getting a job in our business.

Please understand that I have no personal connection with FSU or its Seminole Productions. In fact, the meat grinder of a film school I graduated from many years ago did not even keep statistics on how many of its students ended up with jobs. That's why I feel it is so important to herald a program that takes the realities of building toward a career in video so seriously for its students. Florida State University's Seminole Productions, like many other worthy academic institutions, is a nest from which many sports editors and video professionals in general are earning their wings to fly.

*Jay Ankeney is a freelance editor and post-production consultant based in Los Angeles. Write him at 220 39th St. (upper), Manhattan Beach, Calif. 90266 or at* JayAnkeney@aol.com.

# PRODUCTS & SERVICES SHOWCASE

# PRODUCTS & SERVICES SHOWCASE

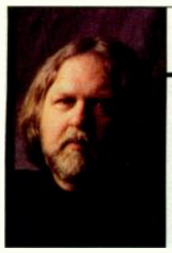


Photo: Steve Jordan

## THE BIG PICTURE — Frank Beacham

# World Events Provide Window To Turbulence in Big Media

Open your eyes and ears. Observe. Think. Note that we're experiencing rapid changes in how we learn about world events.

To the outside observer (or audience), this steady change is subtle, yet still profound. For the traditional media businesses attempting to deal with it, the effects are profound, in some cases, even life threatening.

Examples are everywhere. Take Saddam Hussein's hanging. The world's major media outlets were supplied with an official government video recording of the hanging. It had no sound. A mobile phone video soon emerged on the unofficial Internet. It had sound. Turns out the real story was in the sound.

This amateur recording, which showed up first on independent Web sites and on major media outlets later, triggered international outrage. It could become a historic moment in the U.S. involvement in the Iraq war.

To no one's surprise, rather than walk down a red carpet to get an award, the maker of the video that told the truth was arrested. A few weeks later, in another part of the world, New York City Mayor Michael Bloomberg, a man who knows something about information technology, announced that his city's 911 call centers and 311 service lines would soon be able to receive video and still images from mobile phones.

"If you see a crime in progress or a dangerous building condition, you'll be able to transmit images to 911 or online to NYC.gov," he said.

When the picture service is extended to 311, a hotline established to deal with nonemergency, quality-of-life concerns, the mayor said it would hold "city agencies accountable for correcting [issues] quickly and efficiently."


©iStockphoto.com/Marko Plevnjak

A spokesman for the mayor said the popularity of text and photo messaging and services like Google and YouTube made the city's initiative a natural next step for emergency services. In another development, the FCC granted approval to a merger of AT&T and BellSouth, two telco giants. The new company will control half the nation's phone and Internet access lines. Its co-owned wireless company, Cingular, now becomes AT&T (again).

The newest AT&T plans to offer a high-speed 3G service that allows video to be shared while talking on a phone. And, in a high-profile side deal, Apple announced a partnership with AT&T to sell and support its iPhone, a multipurpose computing device with built-in camera that records images and transmits them over the phone network.

Simultaneously, there's been turmoil for media workers, as well as top executives, as 2007 takes hold. In the Washington, D.C. bureau of the Belo newspaper chain, two veteran television reporters whose stories appeared on Belo's 19 broadcast stations were laid off. They are to be replaced by videographers who will shoot digital video for the Web sites of Belo's 11 newspapers, including the Dallas Morning News.

The changes at Belo were due to a lack of synergy between the broadcast stations and newspapers.

"It was a failed experiment," Tom Ackerman, one of the laid-off Belo TV reporters, told The Washington Post. "There were great aspirations, but it was never followed through. It was a mismatch."

There was another level of "mismatch" at the troubled Tribune Co., owner of 11 newspapers and 24 broadcast stations, when very low bids arrived for both its entire company and its television stations alone. At the time this column was written, the company was considering its remaining options.

Other widely heralded newspaper-broadcaster marriages have or may be close to ending. The New York Times Co. recently sold its nine television stations for nearly $600 million. Before that, it had ended participation in a co-produced television channel with Discovery Communications.

E.W. Scripps, owner of 19 newspapers and 10 TV stations, made it known recently that it may split its newspaper and TV properties into different companies.

This laundry list of events creates snapshots of at least two distinct trends now occurring in media:

First, mobile phone video is already a powerful and significant information tool. With better pictures and greater bandwidth ahead, the technology may eventually revolutionize television news by democratizing video reporting to the level of the blog. It's impact could be huge.

**The technology may eventually revolutionize television news by democratizing video reporting to the level of the blog.**

### DISRUPTIVE FORCES

Second, traditional media companies are struggling because customers of both the television and print industries are transitioning to the Internet.

In a recent article investigating what went wrong with media consolidation efforts over the past five years, The Washington Post cited YouTube and MySpace as major disruptive forces in the traditional media business. Both sites, the newspaper said, have demonstrated a mass audience appeal for short video clips, both professional and amateur.

Couple that with lower cost video technology and a new generation of multimedia reporters to use it. The Post said newspapers have found it much cheaper to use entry-level reporters to shoot digital video and post it on a Web site than to pay a professional video crew, reporter and producer to create three-minute broadcast segments.

For that reason, many newspapers are now training their reporters to shoot video. Some print reporters already shoot video to accompany their articles when they appear on their newspaper's Web site. And some newspaper sites already have more original news video than their television counterparts.

Television news as it was only a few years ago is now over.

*Frank Beacham is a writer and media producer based in New York City.*

## AUDIO BY DESIGN

Mary C. Gruszka

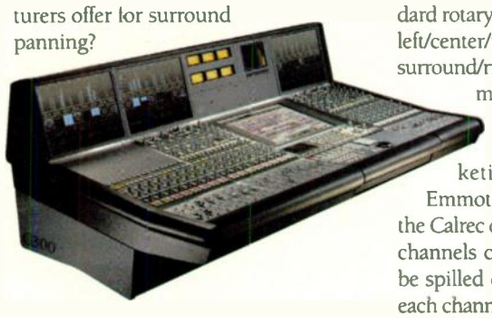
# Surround Panning with Digital Audio Consoles

As you continue your search for the surround sound console of your dreams, here's one more item to add to your checklist—panning. Surround panning that is. If you're familiar with stereo consoles, you know that you can pan a channel hard left, hard right, virtual center (in both left and right channels at the same level), or somewhere in between. With surround and its five main channels (front left, center, right, and rear left, right), there can be more ways of panning than just the front left and right of stereo.

Niall Feldman, director of product marketing at Solid State Logic, summarized types of surround panning to look for.

"Stereo consoles deal in positioning between left and right and usually use a simple law to determine the change in level as the signal is panned from left to right," he said. "In surround, you need to be able to position the signal between all the speakers, control the gain law between the positions to create point sources or more ambient effects, and also manage how the signal level changes as you move the sound between the outputs to create fast, dynamic motion or gently changing soundscapes."

So what do some console manufacturers offer for surround panning?



*Solid State Logic C300*

Feldman said all SSL C-series digital consoles have numerous surround panning features, from simple positioning to features such as divergence control, which adjusts the focus of a sound from a point in space.

The surround sound panning that Calrec provides for its Alpha, Sigma and Zeta consoles allows the signal from one particular channel to be placed and moved throughout the surround sound image. This is accomplished by a number of standard rotary controls for such functions as left/center/right pan, front/back pan, left surround/right surround pan, and adjustment to the front and rear width of the surround signal, according to Kevin Emmott the marketing coordinator for Calrec.

Emmott said that the "spill panel" on the Calrec consoles, where the individual channels comprising the 5.1 input can be spilled out to individual controls for each channel, can better define treatment for each channel, not just for panning, but for other processing like EQ or dynamics.

Some customers may find that a joystick is easier for them to place a sound source within the soundfield or to make more dynamic level adjustments (on-the-fly).

Calrec offers a joystick option for its consoles. The SSL C300 has optional joystick controllers that can be assigned to any two processing parameters, including surround position. The SSL C100 and C200 have on-screen controllable X-Y panning capabilities as well as traditional physical knobs, according to Feldman.

Euphonix can outfit its Max Air and 5-B consoles with joysticks, but Andrew Wild, the vice president of marketing for Euphonix, said joysticks tend to be used more in post production when the audio mixer is trying to get the movement of the sound effect to exactly match the picture, which usually takes a couple of attempts. But for live sound mixing, their use may be limited since the audio mixer usually places a signal using the left/right and front/surround pan controls and leaves it there for the duration of the show.

"Even without the joystick, you can still do some impressive moves with the pan controls," he said, "and we do provide a rotate control for spinning the source in a circle around the spatial image which can be very cool in certain situations."

Besides the left/right, front/back panning, and rotate, the Euphonix consoles also provide focus and divergence controls. These affect the front left, center and right channels of a 5.1 signal.

Focus ranges from 0-100 percent. With 100 percent focus, panning is normal so only the center channel is active, according to Wild. Decreasing focus takes the signal gradually out of the center and bleeds it

PANNING, PAGE 51

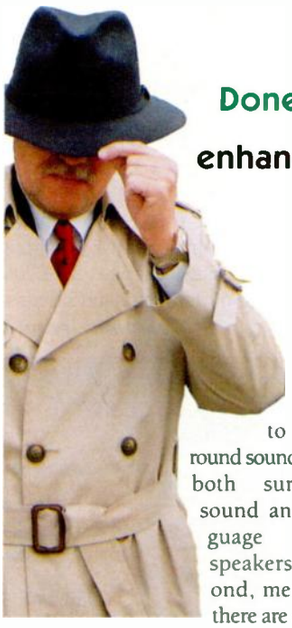
THE MASKED ENGINEER | Mario Orazio

# Surround Sound IS Easy, Just Put the Speakers...

*You might not have noticed* that there are probably as many languages as people on earth. Yes, of course, I'm ranting this month about surround sound.

I mention those languages on account of some great linguist (Webster: someone good at pasta twirling) once saying a native speaker cannot make an unintentional grammatical error. If that's the case, there must be a separate language for every person to be a native speaker of.

Anyhow, I've got two reasons why this



relates to surround sound. First, both surround sound and language have speakers. Second, methinks there are at least as many ways of doing surround sound as there are languages on earth.

Did you make it to either NAB or IBC last year? Then you probably went to NHK's Super Hi-Vision demo, the one with 16 times more pixels than the 1920 x 1080 that some folks have been calling full HDTV. But that's just pictures. Did you happen to notice that the system also has 22.2-channel sound?

In base-10 math, .2 stands for two-tenths. In surround sound, it stands for two subwoofers. There are 22 speakers and just two subwoofers because low-frequency sound is largely nondirectional.

"But, Mario, if they're nondirectional, why do there have to be two?"

I rest my case.

If you think 22 channels of surround sound are just for special venues with Super Hi-Vision projectors, you ain't been shopping for home audio equipment lately. Go to the A/V receivers page of Denon's Web site, and you'll find the first two products listed having 22 channels of surround sound (the remaining 13 have a mere 7.1 channels).

**Done properly, surround sound enhances the viewing experience; screwed up, it can royally wreck it.**

## SPEAKER LOCATION

Denon ain't alone, but ignore all those consumer products with numbers greater than 5.1. So you've got a subwoofer, which either is or ain't directional but has to be located somewhere. Then you've got a center speaker, which you place above or below your TV, thus magnetically screwing up the color if you happen to be among the majority of viewers still using picture tubes.

Left front and right front are probably going to be placed in front of you towards the left and right. So far, so good. But then you've got left and right surround.

I ain't talking about signals here, even though you do have to be careful not to mix up your AES pairs so you don't get left surround coming out of the center speaker and right surround trying to come out of the subwoofer. No, I'm just asking where the surround speakers ought to be.

In just about any TV control room, they're going to be at the top of the rear wall. Hey, it's surround sound, right? You ought to be surrounded by it.

Right about now, you might be getting a little bored, so I'm going to recommend some field trips. The first is to the Web site of composer Wendy Carlos. Click on "Surround Sound."

You'll find more diagrams of possible speaker locations than there are surround channels on a Denon receiver. You'll probably recognize one of them. It's the one I just described. It's labeled "The Worst Surround Setup." In her "Ideal Surround Speaker Placement" (5.2-channel, by the way), the surround speakers are at the listener's sides.

To find out why, take another field trip. This one's to your local movie theater. These days, chances are excellent that it has surround sound.

If you look around, you'll see a bunch of speakers, but you won't see the subwoofer; it's hidden. You also won't see the left front, right front, or center speakers. They're all behind the screen, which, if you go right up to it, you'll see is perforated. What that means is that all of the speakers you can see—even the ones down near the front of the auditorium—are surround-sound speakers.

That doesn't mean your theater is equipped for 44.4 surround (or however many speakers you counted). If it's 5.1, all the speakers on the left side are getting left surround and all the ones on the right are getting right surround. To most viewers, the surround sound is coming from the front, side, and rear.

If it's something like Dolby Stereo, then all the visible speakers are surround, period. That's all Dolby Stereo offers: left, center, right, and surround.

What's all this got to do with the rotten price of Chinese tea in Denmark? It just means that even if you're an expert on the mixing and monitoring of surround sound, it ain't simple. I ain't even gotten into the 6.5-frame delay of AC-3 or when to use "continuous" mode and when to use "burst" mode when you're recording that stuff.

If I've scared you enough to make you at least think a bit about surround sound before jumping into it, my rant this month ain't been in vain. Done properly, surround sound enhances the viewing experience; screwed up, it can royally wreck it. But here's some good news.

There ain't any law, rule, or regulation that says you've got to send out more than plain old mono sound even on your digital broadcasts. And, for a talking-head news show, maybe mono makes the most sense. Going to 5.1-channel sound without being able to monitor it properly is begging for trouble.

Just ask the folks who were at NBC master control in the early days of stereo TV sound. They once got an episode of "Miami Vice" in which the stereo tracks had dialog out of phase to music-&-effects. They went for good dialog instead of good M&E, probably the best they could have done at the time (another option might have been sending out just one of the stereo channels).

Too bad someone up the chain didn't think stereo needed correlation monitoring. The show might've been better in mono.

*Mario Orazio is the pseudonym of a well-known television engineer who wishes to remain anonymous. E-mail him at* Mario_Orazio@imaspub.com.

## Panning

CONTINUED FROM PAGE 49

into the left and right channels. At 50 percent focus, all three front channels receive the same signal, so the image is "out of focus" and spread equally across the three.

Another way to look at this is that the signal blurs across the front three channels. As you decrease focus and then pan, the signal moves from left to center, and then begins crossfading into the right channel before the left channel has completely faded out. This results in a smooth dynamic panning of sound sources across the front soundfield.

Wild said the purpose of divergence is to allow someone listening on the extreme left or right to hear a sound panned fully to the other side. At 100 percent divergence, panning works normally—a source panned to the center feeds only the center channel; if panned hard left, the signal is only fed to the left channel, and not the right or center, as examples.

But if divergence is decreased, the degree of panning is decreased, Wild said. The signal level increases in channels that previously had no signal, and the difference in signal level between channels decreases. As an example, if you had panned a source to the center, and then decreased the divergence, the center channel remains at the same level as before, but now some of that signal also bleeds into the front left and right channels. At 50 percent divergence, a sound panned fully left will retain approximately half its signal level in the right channel compared to the left. Wild points out that the use of focus and divergence can enhance the way the listeners hear 5.1.

"Film mixers are usually very aware of these controls, as they have been working with surround for years," Wild said. "Most broadcast engineers don't realize how useful these controls can be until they learn how to use them."

Studer offers standard panning on its consoles, like the Vista 5 and Vista 8, and also divergence, center size, balance, sum panning and front-to-back panning. In addition, Studer goes beyond pan controls that adjust only the signal level. Studer's VSP (virtual surround panning) provides sound localization by letting the user vary amplitude, signal delay and frequency response in the surround setup when panning a sound source within it, according to Stefan Ledergerberthe Vista Series product manager for Studer Professional Audio GmbH.

This creates localization cues similar to those that a human uses in determining the direction of a sound source. VSP takes into account whether the soundspace is in a large or small room.

Clayton Blick, national sales manager at Studer USA, said VSP can create sound that appears to originate to the left of the left loudspeaker or to the right of the right one. VSP can also place a sound 25 feet in front of center or two feet in front of center, as a few examples of its capability.

But Blick cautioned its use if the 5.1 signal is to be downmixed in any way, because VSP does play with time (in terms of delay) and frequency. It could possibly cause havoc in some of the downmix formats, so it's important to listen and monitor for compatibility in mono, stereo and the various downmix formats.

But for discrete 5.1 mixes that will be distributed discretely, for foley work, dialog replacement, audio post, live sound, VSP can provide some creative tools to the audio mixer. The audio mixer has quite a range of creative control of sound placement with all these various panning controls. How these get used in practice often depends on whether the mix is live or done in post.

Emmott from Calrec notes, "Creating panning effects in film or drama productions is done in the post production process where there is the luxury of time to play with panning. In a live environment, especially sports, there is not the time to do complex panning, so most of our customers set up an ambient surround mix which is fixed for duration of show. They will use this as a surround sound bed into which normal stereo imaging is placed."

*Mary C. Gruszka is a systems design engineer, project manager, consultant and writer based in the New York metro area. She can be reached via* ***TV Technology****.*

# PRODUCTS & SERVICES SHOWCASE

**PRODUCTION MANAGER** **Craig Johnston**

# Management Policy Deserves Intellectual Rigor

I was taught a long time ago, in managing employees at a business (or your own children at home), that if you have to resort to "because I said so," you might get your way, but you've lost the argument.

A recent Newsweek interview with Jonathan Oppenheimer, a young, fourth-generation director of the diamond company De Beers Group, brought this to mind.

Because he's had to lead much more senior managers at De Beers, he was asked for advice he'd give to young managers stepping into a similar role. "Win your employees' intellectual respect," he said.

Oppenheimer noted that early on, he had used his position as a De Beers owner to get something done his way. "...it was embarrassing because it demonstrated a failure of reason. If I could have done it again, I think I would spend whatever time was needed to have my argument carry the day."

I don't think his point could be stated any clearer than that.

## SILVER-TONGUE JONES

There are plenty of other challenges new managers can face. For example, a close relative of "because I said so" is "because we've always done it that way." The new manager is not as likely to say this as to have it said to him.

Here's a good place for the new manager to do his best impersonation of Silver-Tongue Jones. Figure out a polite way to ask "why?" Perhaps you could try something like: "That's interesting. Can you give me some background on that?"

An occasion like this is also a good point to take some time and ask both your own supervisor and some of the more experienced fellow department heads about these company habits.

Through this extra research, you might find that there's a piece of equipment you've assumed the station has, but in fact they don't. You might find there are local conditions that have dictated they do it the way they do.

You may even find that they've got a better way of doing it.

But in the same way that you owe your employees more than a "because I said so" rationale for a decision, someone ought to be able to give you a good reason why it's always been done that way. Just find a nice, soft way of asking. Managers sometimes find an easy escape in the mantra: "It's company policy."

Heck, it's written right there in the employee manual... might as well be written on a stone tablet. And if you don't enforce it, you could be out of work yourself. Fine, but if you can't explain the rule and why it's there, you'll not only be making yourself seem foolish, but the company seem trivializing as well.

There's a lot a new manager has to do when he gets his first managing job, and one piece of homework should be to carefully read not only the employee manual but collective bargaining contracts as well. Find something that you don't understand? Or find something that you don't understand why it's there? Ask.

Think that's going to be tough? Try the unwritten rules. Unwritten rules are more likely to trip up a manager coming from another company or station than for a manager promoted from within. And by their very nature, there is no list of such unwritten rules, though they can have just as strong a standing as those codified.

I worked at a company where, for three decades or more, no one flew first class. It was never written down in any policy manual, though I think it may have been written in letters of understanding with travel agencies the company used. But no one flew first class.

The rule went back to the 1950s, when the national sales manager flew first class cross-country, and ran into the company's founder and chairman.

"I didn't know you were on the flight," he said.

"You would have if you'd sat back in coach where I did," said the founder.

No one flew first class after that. It was an unwritten rule.

You have every right to check with your supervisor or another department head about such an unwritten rule. Just don't act incredulous when you ask about the rule. It may seem strange to you, but it may have been serious business at the company for, as in my example, decades.

*Craig Johnston is a Seattle-based Internet and multimedia producer with an extensive background in broadcast. He can be reached at craig@craigjohnston.com.*

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**In the same way that you owe your employees more than a "because I said so" rationale for a decision, someone ought to be able to give you a good reason why it's always been done that way.**

# EQUIPMENT REVIEW

Equipment and product reviews from professionals in the video industry

VIDEO FILE SERVER

## Avid MediaStream 8000

**by Geoff Poister**

The Avid MediaStream 8000 play-to-air server is newly upgraded to Version 3.30. The system has actually been around in various incarnations for many years, and is widely deployed in major broadcast facilities worldwide.

The MediaStream server was first developed by Hewlett-Packard and then was acquired by Pinnacle Systems. With the acquisition of Pinnacle Systems and the Media-Stream product line last year, Avid accelerated plans to improve the server and set about integrating it with other Avid products.

CPU speed has been increased tenfold, HD capability has been improved, the channel capacity of the server has been increased and editing capability has been built into the workflow design.

### FEATURES

MediaStream 8000, in its most basic sense, is a method of storing large amounts of digital video so that programming can be ordered and played out for broadcast. Its basic components are a file system controller, a system chassis that contains from one to 16 independent video I/O channels and one or more durable RAID arrays for storage.


*The Avid MediaStream 8000 video file server*

MediaStream 8000 comes in two configurations: MediaStream 8000si with dedicated storage for stations broadcasting one or a small number of channels, and MediaStream 8000ns with networked storage for facilities broadcasting a large number of channels. Capacity is expanded by adding chassis, which can contain up to 16 I/O channels each. By adding enough chassis to the system, a facility can broadcast content to hundreds of channels simultaneously.

MediaStream's I/O cards do the coding and provide much of the flexibility of the system. Using the MPEG-2 codec, each card supports SD or HD 1080i or 720p with up to eight channels of embedded or AES/EBU audio-per-video channel. To conserve bandwidth, MediaStream also offers

### FAST FACTS

**Application**
Content storage, play-out and editing

**Key Features**
Large expansion capability; ability to mix video formats; high reliability

**Price**
MediaStream 8000 starts at $60,000; no charge for upgrade to Version 3.30

**Contact**
Avid Technology Inc.
800-949-2843
*www.avid.com*

the option of compressing audio, reducing eight channels of audio from 6 to 1 Mbps.

The components themselves are essentially rack-mountable hardware units. So, the beauty lies in the overall architecture of the system, which incorporates a fail-safe redundancy that is more reminiscent of a NASA control center than a television network. But the system is designed to scale for use by clients as large as DirecTV or Turner Broadcast, where hundreds of channels must be managed and played to air 24/7 without interruption.

The system is engineered so that no single point of failure will disable it. Any portion, from storage drives to CPUs, I/O cards, or switches, can fail and the system will continue without interruption.

A useful feature of Version 3.30 is that it enables you to mix HD and SD material on the playlist and it will be automatically up or down converted. Since many channels now broadcasting in HD still incorporate a large amount of SD material, this greatly simplifies the task of playing to air.

For an HD channel, any SD material is automatically up-converted, and for an SD channel, any HD material is automatically down-converted. A new feature of the 3.30 release allows aspect ratios to be selected. Also, the conversion is automated, allowing for letter boxing or center cutting.

New with Version 3.30 is support for higher channel bandwidth—video streams up to 60 Mbps. Avid has also added support for 720p/50, the dominant European HD format. Cross conversion between 1080i and 720p is also supported. Overall server chassis bandwidth has been increased from 280 Mbps to 300 Mbps, providing more channels. Server chassis capacity has also been increased from 12 to 16 channels at 10 Mbps, and the system CPU runs 10 times faster.

A major improvement with MediaStream 3.30 is the ability to feed content into Avid's Media Composer, Symphony or NewsCutter editing systems. Content can be accessed on the server, edited in its native MPEG-2 long GOP form and transferred back to the server for broadcast.

Transcoding is eliminated, making the process faster and preserving the native picture quality. This workflow also allows material to be played to air while it is being transferred from the editor, or for editing to begin while it is being transferred from MediaStream.

An example helps illustrate how this works. Let's say that a live sports feed is being recorded onto the server. While the recording process is underway, an editor can access the feed, edit it into a promo and send it back to the server for air. And if it's a long promo, the server can actually start airing it while it is in the process of being transferred. In this way, MediaStream can be highly effective in a live or very fluid environment.

Avid has also added the ability to manipulate audio content without the need to transcode the original clip. Audio tracks can be deleted or rearranged, or entirely new ones can be added.

## IN USE

MediaStream 8000 3.30 is not a product one can take home and test, as it requires a full-fledged broadcast facility to put it into action. To get a sense of how it functions in the real word, I checked out an up and running installation at Avid headquarters.

The unit I observed was the MediaStream 8000si configuration, consisting of a file system controller, a non-descript unit about the size of a breadbox, a RAID system with ten 250 GB drives, a PC and a chassis containing the I/O cards. All of this resides in a single, compact rack unit occupying about 2-by-5 feet. A monitor was set up to show the file transfer interface. To simulate play-to-air, the chassis was connected to SD and HD monitors.

What stuck me immediately was the simplicity of operation and its

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HD LENS

# Fujinon HA18x7.6BERM HD Lens

**by Carl Mrozek**

As any lens manufacturer will tell you today's HD lenses are among the best lenses ever made and they are among the most expensive too. For an owner/operator, purchasing an HD lens is much more like buying a new car. It's a decision that you will have to live with for at least a few years, if not more. Fortunately, for those working in the broadcast world, one constant has been that all 2/3-inch CCD HD cameras use the same B4 mount as all 2/3-inch SD broadcast and professional lenses. In theory, this enables them to be used either for HD or for ongoing SD applications, unlike much other gear. In reality, this has proved harder to do than one would imagine, in part because even though the mounts match well, dimensions of the outer elements where filters and adaptors attach is significantly different—by 15 to 25 mm. It only needs to be off by a millimeter to render your extensive collection of screw-on filters wide angle/telephoto adaptors and other accessories useless. In my experience, HD zoom lenses with 85mm glass on the far (fat) end of the barrel are quite unusual, but they do exist. One of these is Fujinon's HA18x7.6BERM lens.

## FEATURES

Even at fairly close range the HA18x7.6BERM closely resembles a typical standard broadcast or professional standard zoom lens with a 2x extender. This includes its overall appearance, dimensions (85 x 204-mm.). Weight-wise, it is relatively light as HD lenses go—roughly 3.7 pounds (1.7 kg.), and its barrel is very similar in size and shape to that of other standard pro and broadcast lenses. This stands to reason, as the dimension of its largest, outer element is identical to that of most SD broadcast zooms—85 mm versus 95 to 105 mm for typical HD zoom lenses. That in itself is unusual for an HD lens, and fortunate for anyone with a small or even large assemblage of lens accessories, which attach via an 82 mm filter ring. The lens also features the same camera mount as virtually all current SD lenses—B4. This means that it can be used with virtually any recent 2/3-inch CCD broadcast or pro camera, whether HD or SD. Even the pin configuration of the electronic control plug is identical so that all of its functions remain intact when mounted on a non-HD 2/3-inch CCD camera.

*The Fujinon HA18x7.6BERM HD lens*

Its normal focal length ranges from 7.6 mm to 137 mm, and from 15.2 mm to 274 mm with the 2X extender engaged. Minimum object distance from the image plane is 0.84-meter while minimum object distance from the image plane is 0.6 meter. Maximum aperture is *f*/1.8 up to 105 mm. focal length and *f*/2.4 at 137 mm. With the extender engaged, there is typically a net loss of two *f*-stops.

Featurewise, the HA18x7.6 has plenty to offer. The manual/auto iris selector switch is located in the usual place—immediately in front of the zoom rocker. Just ahead of that is the iris momentary button, which momentarily re-engages auto-iris, while operating in manual iris mode. This makes it easier to achieve correct exposure and/or to use this as a median position from which to push exposure, or underexpose, relative to the correct auto-exposure value.

The zoom rocker is well designed for precise touch control of zoom speed. In addition, there are seven discrete maximum zoom speed positions, which essentially comprise zooming speed limits at those respective settings. Lower zoom speeds can still be achieved with the zoom rocker—up to the speed limit. There is also an auto-cruising zoom function that can be used to maintain a constant zoom speed throughout the zoom at any speed selected.

With the zoom preset function, the lens automatically zooms in to a preset focal length. Once set, zoom and focus can be reset from any other position by engaging the preset function. Another function—"quickzoom"—quickly and completely zooms in to maximum telephoto focal length. This ensures accurate focusing before commencing a long zoom. Selecting quickzoom does not cancel or inhibit other zoom control functions selected. In fact, it overrides all of them, but only momentarily. The override occurs only as long as the quickzoom/autocruising button is depressed.

In addition, the zoom range can be restricted by using a pair of zoom limit control switches to select new maximum telephoto and wide focal length positions. The new zoom limit positions are held, even if the zoom limit on/off switch is subsequently turned off or if camera and lens are both turned off, even for a long period. The values selected are held until reset to maximum telephoto and wide angle. The custom values also apply if the optional remote servo controls are used for zooming, adjusting exposure, focus etc. There is no autofocus function; only manual focus. However, exposure can be adjusted manually, automatically or with a combination of the two by momentarily engaging the iris switch. An optional standalone optical stabilizer, the TS P58A, is also available for use with the HA18x7.6BERM lens and with most Fujinon broadcast grade HD and SD zoom lenses.

## IN USE

I tested the HA18x7.6BERM with a Sony DSR 570W camcorder. Mounting

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## FAST FACTS

**Application**
HD and SD field production and news-gathering

**Key Features**
Compact size, low weight, compatibility with existing filter and accessories

**Price**
$19,700

**Contact**
Fujinon Inc.
973-633-5600
*www.fujinonbroadcast.com*

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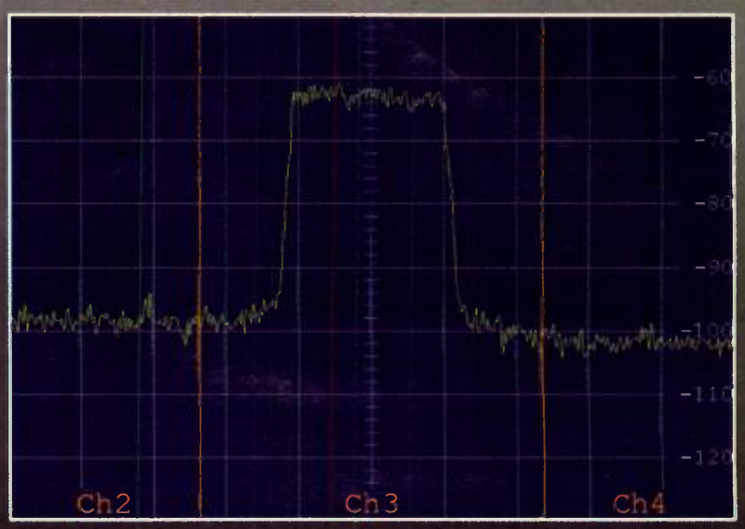
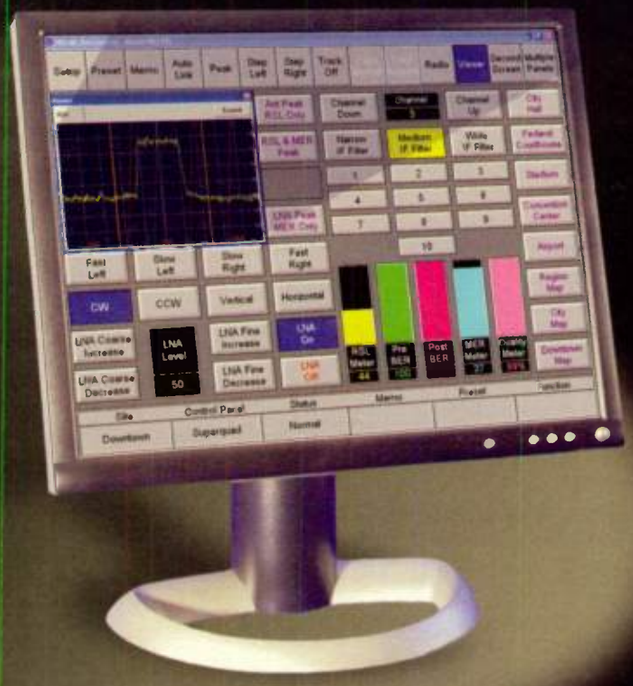



The MC5's spectrum analyzer control enables the operator to monitor the signal quality and to identify problems caused by interfering signals, multipath or excessive signal level. The operator can see the signal at the RF input to the receiver as well as the receiver IF and channel markers make it intuitively easy to use.



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EYE ON EQUIPMENT

# Electronic Cinematography Lenses

by Craig Johnston

Few would argue that the lens is one of the most critical components of a video camera package, but there is a top tier of video lenses that few videographers will ever see, much less use. Cine style lenses meet higher quality standards, have unique features, and are considerably pricier.

Reasons for differences between ENG or outside-broadcast sports lenses and the cine lenses have to do with the size of ultimate video product display, and the type of production environment each is sent out to do.

An ENG shooter needs the same lens to be able to zoom wide enough to shoot a meeting in a small room one day, then throw in a 2x extender the next to zoom in on a plane that's run off the runway. Weight is critical to a person who's going to be carrying the lens all day, and the economics of the TV business dictate that price is a large consideration.

In outside broadcast lenses for sports, the need to shoot a batter 400-plus feet from deep center field or a golf shot from a high tower makes telephoto zoom ranges their bragging points. And both ENG and OB camera operators use their lenses alone, where the electronic cinematographer has assistants to help with lens operation.

ENG and television sports are destined for a much smaller screen than for electronic cinema. Television lenses are designed for a display the size of a window in your house, cine lenses for a display the size of the side of your house.

Lensmakers that **TV Technology** spoke with said their optical design teams face trade-offs any time they try to add features such as long zoom ranges, light weight or low cost. When they're designing cine lenses, they have to tip those trade-off scales to the side of higher quality.

"The larger the display, the more you magnify any kind of lens error," said Chuck Lee HD technology manager at Fujinon. "Things like chromatic aberration might not be noticeable at all on a TV screen, but you blow it up to IMAX, it could be a three-inch red line around somebody's face."

Another area where large-screen errors are magnified is in the corners of the image. "They're going to need correction for geometric distortion, so the corners will be sharp," said Michael Bravin, chief technology officer at Band Pro, which partnered with the Carl Zeiss company on their DigiPrime and DigiZoom electronic cinematography lines of lenses. "Whereas the corners on an ENG lens, you might not spend as much effort on that because correcting for geometric distortion requires more glass, requires more expensive glass, it makes the lens heavier and makes the lens more expensive."

Breathing, veiling and ramping are other lens errors a lensmaker has to avoid in a cine lens.

Ramping, where the minimum *f*-stop gets larger as the lens zooms to telephoto, is a fact of life in high zoom-ratio sports lenses. Cine zoom lens designers limit their zoom-ratios to ranges where ramping is avoided.

*Fujinon HD lenses were used in the production of "A Prairie Home Companion."*

Smaller zoom ratios and a preference to work with prime (non-zooming) lenses lead cine crews to change lenses on a camera much more frequently than an ENG or OB camera. This requires that the lenses match optical color performance exactly.

"Cine lenses use a color index to make sure that all the lenses are within a set specification that is determined by the original optical design," said Chris Beauparlant, sales manager for The

## There Will Be a Quiz

The challenge of building electronic cinematography lenses has caused lensmakers to concentrate on eliminating lens errors that were little noticed, or at least tolerated to some extent, in ENG and OB sports lens models.

**Barrel Distortion** is a lens error where the center of an image begins to bow out toward the sides and top of the frame. It is most noticeable in images with horizontal and vertical straight lines running close to the edge of the frame, and occurs as the lens is zoomed toward the wide end of its range.

**Breathing** is a noticeable change in image size as the lens is focused, sometimes also called pumping. As an example, in a lens that breathes, as focus is followed on a person walking toward the camera, they would actually appear to be getting smaller.

**Chromatic Aberration** is a lens error where different wavelengths of light are not focused onto the same focal plane, or are magnified differently. It causes color fringing on images.

**Flare** occurs when bright light enters the lens and is reflected between lens elements, resulting in reflections of those elements appearing in the image.

**Geometric Distortion** is any error that changes the shape of the image being photographed, such as the effects of barrel and pincushion distortion.

**Pincushion Distortion** is a lens error where the sides of an image begin to be pinched toward the center. It is most noticeable in images with horizontal and vertical straight lines running close to the edge of the frame, and occurs as the lens is zoomed toward the telephoto end of its range.

**Port Holing** is the visible light fall-off in the image corners.

**Ramping** is the unwanted *f*-stop variation as the lens is zoomed. It is the result of a compromise to get a longer zoom range.

**Veiling Glare** occurs when bright light (such as headlights at night) enters the lens and is reflected between optical elements within the lens, resulting in a loss of contrast.

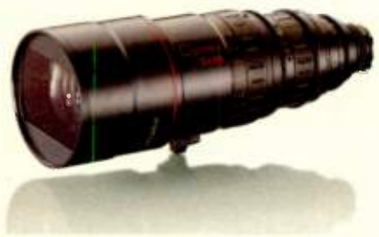
*Craig Johnston*

Americas for Thales Angenieux.

That assures that as a crew switches from one lens to another within a manufacturer's cine lens line, there is color consistency.

It should come as no surprise that focus on the big screen is critical, and the fact that many electronic cinematographers prefer to work with the lens wide open for its narrow depth of field makes staying in crisp focus all the more an issue. Lensmakers design the cine focus ring with critical focus in mind.

Gordon Tubbs, assistant director of the Canon broadcast and communications division said that compared to an ENG lens, a cine lens should have "a much larger focus rotation because a larger focus rotation leads to a finer focus."



*Thales Angenieux Optimo cine style 12x9.7*

Where the focus ring rotation on an ENG lens is intentionally limited so the operator can rotate it from minimum focus to infinity without taking his hand off it, cine focus rings are range from 270 to 360 degrees of rotation. And because film crews use a measuring tape to judge the distance from the subject to the camera, the distance markings on the lens are individually calibrated.

"So the accuracy of the markings on the lens has to be extremely high," Tubbs said. "When we say something's two-and-a-half feet, it's two-and-a-half feet."

Those distance numbers, along with data on the zoom and iris rings, are oriented differently on a cine lens than on an ENG lens. On an ENG lens, those numbers are oriented along the length of the lens so that the solo ENG cameraman standing behind the camera can lean forward and read them. On a cine lens, the numbers are oriented horizontally around the cylinder so that the first assistant can stand on either side of the lens and read them.

As a rule, cine zoom lenses are larger than a comparable zoom-ratio ENG lens because of the desire to work at a wide aperture.

"The limitation of the speed of your lens is primarily the size of the front element," Fujinon's Lee said. "So the bigger the front element, the faster the lens, as long as you don't make it a real long zoom."

Though larger, cine lenses by themselves look somewhat naked, as they don't sport the built-on zoom, iris and sometimes focus servo motors their ENG brethren use. Instead, they're built with precision gearing to accept the zoom, iris and focus motors the film industry has used for years. With all the lens changes, cine crews don't want to have to reposition the motors for each individual lens, Tubbs said.

*Canon HJ11x4.xBKII-SC*

"So when you mount any of our lenses to the camera," he said, the zoom, focus and iris ring "are always in the same place in relation to the camera body."

Frequent lens changes also require attention to the lens mounting hardware, Beauparlant said.

"The lenses have a much more rugged mount to insure a reliable interface with the camera mount," he said.

At the dawn of electronic cinematography, lensmakers were tasked with matching the performance of film lenses that the motion picture industry regarded as the quality standard. Along the way, those lensmakers have found that characteristics of electronic cinematography have required them to exceed that film lens quality.

Bravin pointed out that the larger 35mm film frame requires less lens performance than the 2/3-inch electronic imager to achieve the same image, and with film "you're imaging onto grain that moves, and film that moves."

He also compared to the film finishing process—shooting and developing a negative, making an interpositive, making an internegative and then release prints—to the high-definition process where the picture you shoot can be the one you see on the screen.

"So 35mm film actually has a lot more information than high-def, but by the time you get to a print, a lot is lost," he said.

So where in the past, there was a trickle down from film lens technology to electronic cinematography lenses, that tide may be shifting the other way. Zeiss already used its DigiPrime electronic cine lens technology in its Master Prime lens series for 35mm film production, and other lensmakers may soon do the same.■

CAMERA BATTERIES

# Frezzi Lithium Ion Batteries

by Carl Mrozek

Anyone who has had to carry several NiCad "bricks," each weighing upwards of five pounds, for a day of shooting undoubtedly appreciates the lighter camera battery options that now exist. Nickel metal hydride and lithium ion chemistries have spawned new battery lines that are smaller, lighter, more cost-effective, longer-lived and possess more capacity than their nickel cadmium predecessors.

Lithium ion batteries in particular have become the standard for use in many digital still cameras and small consumer, prosumer and pro camcorders, as well as for portable lights geared for them.

Despite the recent massive recall of some lithium ion laptop batteries due to overheating problems (and even combustion in some cases), battery manufacturers insist that the technology itself is reliable and safe, and that the overheating problems were due to systemic manufacturing defects, not to flaws inherent in lithium ion battery technology, per se.

This is great news for videographers who are ready to ditch their NiCad bricks for something lighter. Lithium ion batteries are available for powering a camera and small light for half a day or so. Recently, I had an opportunity to test a new line of lithium ion camera batteries by Frezzolini, which are touted as offering more punch for less money than any others now on the U.S. market.

## DESCRIPTION

Frezzi's new lightweight lithium ion batteries come in three sizes: 100, 130 and a whopping 200 watt hours. Equally impressive is their incredibly low weight: 1.9 pounds (100 W-h); 2.2 pounds (130 W-h); and 3.1 pounds (200 W-h). According to Frezzi, the new batteries were designed for professionals needing a lightweight battery that has the capacity to run a camera for hours.

Besides being generally lightweight, the new batteries are also comparatively compact. All three models are 6.5 inches long and 3.6 inches wide—fairly standard dimensions for camera batteries. What is remarkable is their shallow depth or thickness relative to wattage. Both the 100 and 130 W-h batteries are only two inches thick, while the 200 W-h model is only 2.7 inches. This is roughly the same thickness and overall size of other popular lithium ion camera batteries—some with only half the wattage.

Frezzi's lithium ion batteries are encased in tough, black, no-frills, hardened polymer shells—rectangular and with smoothly rounded corners. One practical feature is a series of shallow parallel grooves along both sides of the battery. These facilitate a sure grip on the battery's otherwise smooth and slippery skin.

Each battery is also equipped with a four-stage LED "fuel gauge," which is easily activated by a square black button just below the gauge. The LEDs remain illuminated for about 15 seconds, just long enough for a good look, but not long enough to deplete the battery. Also included are

FREZZI, PAGE 68

## FAST FACTS

**Application**
Newsgathering, electronic field production with lights and wireless microphone

**Key Features**
light weight; high capacity

**Price**
FLB 100V $495; FLB 130, $595; FLB 200V, $695

**Contact**
Frezzi Energy Systems
973-427-1160
*www.frezzi.com*

## Fujinon

CONTINUED FROM PAGE 56

it was no different than with any other broadcast/professional lens, due not only to its B4 mount and pin configuration, but also to its size and weight. This compares with standard SD zoom lenses, including the 85-mm outer diameter and 82 mm filter size.

The basic layout and functionality of switches, rocker arm and lens rings are also quite familiar, except for some pushbutton switches not found in more basic SD lenses. These include the "zoom maximum control knob." Once set, skillful use of the zoom rocker arm still determines zoom speeds up to the maximum selected. This can also become a constant speed if enough pressure is placed on the zoom rocker. However, the zoom rocker is sensitive enough so that you can ramp up slowly to the maximum zoom speed selected.

Another function, "quickzoom," momentarily overrides the max control setting selected by quickly zooming in all the way, and at the fastest zoom speed feasible. This one-touch operation provides a convenient and fast way to check and guarantee proper focus at the very end of a long zoom, before it's done. Simply press and hold the quickzoom button as long as needed in order to focus. Once the button is released, the lens zooms back out, either to the full wide position or to a preset point. Placement of this switch next to the lens VTR trigger button makes it easy to find and to check focus before starting a zoom. For that reason, and because I am a stickler for sharp focus, especially for HD, I used quickzoom often. This feature, coupled with peaking adjustments in the viewfinder, enabled me to stay nearly perfectly focused without having to continually tweak focus.

In general, the tension on the focus ring was what Goldilocks would have wanted: not too tight, not too sloppy, but just right. It rotated readily, but not too easily and held its position quite well after being released. The focus ring seems a bit less bulky than with many other pro lenses and it tapers in a bit. This reduces the chance of accidentally changing focus by brushing it with one's gloved hand or sleeve while adjusting other features on the lens.

The quickzoom button actually has a dual function in holding zoom speed. The "auto-cruise" control operates very much like cruise control on a vehicle—to keep a constant road speed, or, in this case, zoom speed. This leaves one hand free to do other things like adding another camera move by panning or tilting during the zoom. This must be done while zooming, as auto-cruise engages only when a zoom is in progress, at the speed of movement at the time the button is pushed, just as on a vehicle.

Auto-cruise has no memory and must be reset after ending the zoom move. The normal variable speed functionality of the zoom rocker is the default mode. Nevertheless, auto-cruising does make it much easier to achieve buttery smooth zoom-ins and zoom-outs at perfectly consistent speeds. It also makes it much easier to inject a second layer of movement such as a pan or tilt without affecting zooming speed. The net effect is a much more dramatic zoom which may have a memorable impact on a viewers, and as such, may well be worth the slight bother. This did require a bit of practice to achieve the desired speed on the first try. One shortcut was to quickly hit a pre-selected max speed level (via zoom speed control knob) before selecting auto cruising control to lock in that speed. In this way any of the seven discrete zoom speeds on the dial can become the auto-cruising zoom speed.

It is also feasible to shorten the length of a zoom by setting new start or end points. There are two marker buttons, one for trimming the zoom at the telephoto end of a shot and another at

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MASS STORAGE

# Ciprico Media Vault 4440

by Michael Hanish

Anyone who hasedia Vault appropriately describes Ciprico's flagship array, the MV-4440. It's built like a bank vault and weighs about the same. This is not your grandmother's array, made for a light drive to the supermarket at a discreet speed.

It's extremely high-speed and high-capacity storage for video and/or digital cinema files, made shareable through Fibre Channel. It's RAID 5-capable, with hot swappable drive pods and a list price on a fully configured 6.4 TB model of nearly $30,000. The recommended ATTO Celerity 4 GB Quad Channel FibreChannel Host Adaptor card is another $2,995. But if your project involves uncompressed HD, 2 or 4K digital cinema, contact Ciprico.

## FEATURES

As you can see by the illustration, the MediaVault is designed to echo the shape and construction of Apple's MacPro and older G5 tower line of desktops. Its frame is approximately 6-by-15-by-15 inches and it weighs in at about 60 pounds.

The unit consists of four vPODs (drive bay and drive controller modules; not hot-swappable, but actually an independent RAID) and a power module. The vPODs came to the review populated with 1.2 TB of storage each, making a RAID-able maximum of about 4.6 TB. The vPODs and power supply can be easily field-replaced by the user in case of failure.

Colored LEDs on the front and back of the unit indicate status: Fibre Channel speed, RAID mode, power, service and disk activity.

On the back of each vPOD is a numbered switch, similar to the SCSI channel indicators we all know so well, which is used to set the RAID mode. Basically, the choice is between RAID 0 (simple striping, with no redundancy, and retention of full array capacity) and RAID 6 (data is written across fewer drives, preserving some 20 percent of capacity for redundancy), but there are a number of variations for each mode.

To put it as simply as possible, if even one drive of a RAID 0 array fails, the whole array is rendered useless. If one or two drives in a RAID 6 array fail, the array is automatically rebuilt using the redundant data and it will continue to function normally until the failed drive can be replaced. The price paid for this protection is the loss of 20 percent or more of the available data space, and a performance hit due to the extra time it takes to write the redundant data.

CIPRICO, PAGE 65

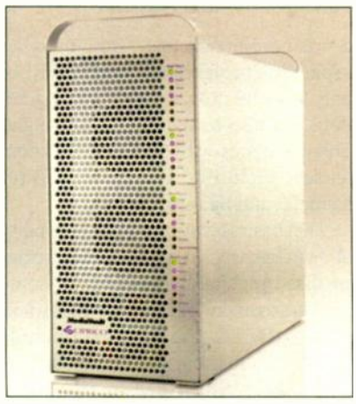
## FAST FACTS

**Application**
Extremely high speed storage of video or digital cinema content

**Key Features**
Optical connectivity, user-configurable RAID parameters

**Price**
$29,899 (6.4 TB storage); recommended Celerity FiberChannel card, $2,995

**Contact**
Ciprico
763-551-4000
*www.ciprico.com*



*The Ciprico Media Vault 4440 high speed and high capacity storage array*



## Avid

CONTINUED FROM PAGE 55

flexibility. Once content resides on the server, it can be accessed and used in any number of ways.

The play list included a mixture of SD and HD material, all of which played flawlessly on both the SD and HD monitors. If these were channels, we would have been broadcasting an HD and an SD channel with real-time conversion of all material, including automated aspect ratio conversion. Each channel can be configured to play a different assortment of material from the server content.

MediaStream also does real-time conversion of 1080i and 720p material. This makes it very simple to mix different HD source material and play it to air without an extra step. For example, if you are broadcasting in the 1080i format, any 720p or SD material on the play list will be automatically up-converted in real time.

The ability to access material on the server, edit it in Avid Media Composer, and feed it back to the server for play-out was particularly impressive. The Media Composer handled long GOP MPEG-2 content with ease. We were able to create a new edit without any transcoding, so the original quality was unaltered, and the time-consuming transcoding step was eliminated.

The system also demonstrated its failsafe performance. While content was being played to air, we disabled several drives in the RAID and even switched off a controller. The video continued to play without so much as a dropped frame.

### SUMMARY

MediaStream 3.30 is a significant improvement over the already impressive earlier version. This is the first major revision since the product was acquired by Avid, and as such, now incorporates better integration with other Avid products. This includes the ability to edit material from the server in native MPEG-2, using Avid Media Composer, Symphony Nitris, or NewsCutter systems.

A testimony to the functionality and reliability of MediaStream 8000 is the fact that it is the system of choice for the most demanding users such as Turner Broadcasting and DirecTV. This is a newly refined system that has been tested in the field for many years, and has been engineered for the utmost reliability. It is about as fail-safe as a system can get and now incorporates features that greatly increase its utility.

*Geoff Poister, Ph.D., is a member of the Film and Television faculty at Boston University and a regular contributor to TV Technology.*

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SIGNAL MONITORING

# Leader LV5750 Portable Monitor

**by Joey Gill**

As the audio/video industry evolves, so do the tools for the test and measurement of the signals that drive that industry. Digital video and audio have been around for a while, and so have the test instruments that are used to test and evaluate the digital equipment. Digital test and measurement is a common task in today's studio environment.

In the field, however, it is often difficult to evaluate signals due to a variety of circumstances. As broadcast plants have evolved toward the DTV environment, test gear has often been either completely overlooked, or perhaps a few minimally capable test sets were purchased, with plans for upgrading at a later date.

Either way, broadcasters may be operating with fewer test instruments than just a decade ago. This makes it even more exciting for me when I discover products that can serve a multipurpose role. Leader Electronics Corp. has developed just such a product with their LV5750 Portable Multi SDI Monitor.

Not only does the monitor serve as a very powerful studio test and measurement tool, it is also a truly portable instrument. I'm not sure if Leader calls it a "multi" monitor because it provides several types of displays in addition to standard waveforms, or perhaps because it can monitor so many different formats. Any way you describe the LV5750, it is pretty impressive.

## FEATURES

The LV5750 weighs about five and a half lbs, and measures 8.5-by-5.25-by-4.75 inches. Its operating range is between 10 and 18 VDC and it consumes a maximum of 40 watts. The unit ships with a DC power supply, but unlike a lot of equipment now, this is not a wall-wart type transformer. This supply is a very nice inline device, which doesn't occupy much space.

For portable use, the LV5750 operates with the widely used Anton/Bauer Gold Mount three-post battery mount, which is attached squarely on the unit's rear. This type of battery is used extensively throughout the broadcast industry and is readily obtainable. For protection while in the field, Leader provides a nylon carrying case. It is very rigidly constructed to prevent damage to the unit and has a carrying strap and closure hardware that appear to be rugged enough to provide many years of service.

The LV5750 accepts a variety of video formats, including: SMPTE 247M-292M, SMPTE RP211-292M, SMPTE 296M-292M, and SMPTE 259M. Included are 1080i/p, 1080PsF, 720P, 525i, and 625i. Sampling frequencies are auto-selected.

SMPTE 291M ancillary data is accepted, as well as embedded audio using HD-SDI SMPTE 299M, or SD-SDI SMPTE 272M standards. Audio can be monitored through a mini stereo jack, and the volume level is menu-controlled.

High quality LCD technology is used for the display with an image as sharp as I've ever seen from a display of this type. The effective display resolution is 1024x768. Viewing angle and brightness are not issues, but Leader does offer an optional hood for viewing in bright daylight.

*The Leader LV5750 portable multi SDI/HD monitor*

The LV5750 has an image-capture feature and provides users with a menu directory for calling up various control functions. There's a user-assignable "shortcut" button for direct access to frequently used functions. Menu values are entered via a "function dial."

In addition to waveform and picture displays, the unit offers vector, overlay, parade and timing presentations.

Monitoring of embedded audio is available via a convenient front panel mini stereo jack.

There's a slot on the rear of the unit for either a Compact Flash memory card (standard equipment), an optional Ethernet-enabling RJ-45 card, or for the optional remote control DB-25 remote card. The Compact Flash card unit must be removed to allow either of the optional devices to be used.

Two BNC connectors are provided for SDI video input, with two more used for external reference feeds. A fifth connector labeled "SDI Out," provides a reclocked version of the input signal for feeding a picture monitor or other equipment. The power connector is a 4-pin XLR type. A small rear-mounted fan is provided for cooling. The LV5750 comes with a two-year warranty.

## IN USE

The LV5750 was packed very well and properly secured inside its shipping container. Accompanying it was the DC power supply, protective case and a very complete operator's manual. The monitor arrived in excellent condition and was ready for use once the power supply was connected.

The physical appearance of the LV5750 is quite interesting. While the front end has a familiar appearance, the lack of physical depth quickly sends the message that this is not your ordinary waveform monitor.

I fed power to the unit and turned it on. After connecting up an SDI signal and selecting "multi" from the display, it became readily apparent how slick this monitor really is. Not only could I evaluate SDI waveforms, but I could also see the waveform, the video content (in color) and the audio levels all at the same time. The video display was very sharp and colors were pure and true. The picture quality was outstanding.

Once I got past my initial awe, it was time to explore the menu selections available.

As is the case now with a lot of equipment, control and operational modes are handled through a combination of dedicated front-panel buttons and knobs, assisted by a series of mode-assignable function buttons (F1-F7) located directly under the LCD screen. As the user scrolls through various modes and features, the screen legends for these seven buttons changes accordingly.

At first, moving around the function-and-control menu structure seemed a bit complex, but became second nature after a while.

Bringing up and trying each and every one of these assignable features is an education in itself and there are so many options available that there's only space in this review to highlight some of them.

For starters, operations available with the "capture" button include: real-time display or image freeze, saving to the Compact Flash memory and selection of image file type. Recall of stored images is readily available.

Vertical and horizontal display centering are accomplished through old familiar control knobs and a "mode" button lets you step through overlay, parade or timing displays.

Six discrete control switches are provided for user selection of displays. These include: waveform, vector, picture, audio, multidisplay mode and a "status" screen.

Functions such as display intensity, instrument gain, line selection, color system and the like are controllable through the seven mode-assignable buttons under the display.

Display of audio information is not limited to the typical bar graph. It includes such niceties as a surround display and Lissajous patterns. Up to eight channels of audio can be tracked with the bar graph displays, with user-controllable mapping of a particular channel to the desired bar.

The LV5750 doesn't stop with just displaying video and audio. I could also easily look at such things as ancillary packet information, dump data and perform a reset.

During the period I was evaluating the LV5750, political ads were running abundantly on our TV station. The FCC requires that political ads have a disclaimer occupying at least 20 lines (NTSC) and lasting for at least four seconds.

One of the more common duties performed during political ad season is to count the number of lines that

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## FAST FACTS

### Application

SDI/HD signal monitoring in studio or field environments.

### Key Features

Innovative multidisplay, ease of use, many useful features, portable operation and a two year warranty.

### Price

MSRP as tested is $10,995 (carrying case and power supply are included). Batteries and a charger for portable operation must be purchased separately, as they are not available from Leader. Prices could range from $495 to more than $1,000.

### Contact

Leader Instruments
800-645-5104
*www.leaderusa.com*

## Ciprico

CONTINUED FROM PAGE 62

The variants range from simple RAID 0 striping, using the full capacity, and RAID 0 Turbo (uses only the highest data rate portions of the array, yielding about 80 percent of available capacity) to RAID 6 and RAID 6 Turbo (yields about 40 percent of available capacity using only the highest data rate portions of the array). Fortunately, all of this is described in the brief but explicit User's Guide.

The MediaVault connects to a Fibre Channel host card in your computer—for this review, this was the ATTO Fibre Channel card described above—via duplex optical cables. There are slower and less expensive host adaptor cards, but the penalty is slower performance. This ATTO Fibre Channel card seems to be far and away the fastest available.

There are a lot of fans in the MediaVault, so be prepared for an increased noise level. However, the MediaVault is not as loud as some of the older SCSI enclosures I've used. And, one of the benefits of optical cable connections is the ability to locate the array hundreds of meters from the host system. This should ensure peace and quiet at the editing desk.

### IN USE

Setting up the Fibre Channel card and the MediaVault was painless and straightforward. The PCI-E ATTO card slid right into one of the available slots in my G5; the thin optical cables were a simple connection; and the MediaVault powered right up. Fibre Channel doesn't require a system restart for the array to be recognized, which is a vast relief, and a time saver from the SCSI days. However, it is necessary to power down the array when changing RAID modes.

I used Apple's Disk Utility to set up the RAID. On power up, my system saw the four vPODs as separate volumes and allowed me to stripe them as one volume, simply striped, or with redundancy. (Windows (NT, XP, 2000 users would use the built-in system utility.) I tried each of the Macintosh-specific RAID modes, constructed the array and then ran AJA's Kona System Test utility (recommended by Ciprico tech support and available free from www.aja.com) to get a sense of write and read speeds.

I didn't get into obsessive parameter tweaking, preferring instead to throw real world challenges at the hardware. At the most basic settings, the AJA test showed sustained read speeds between 800 and 950 Mbps and sustained write speeds of between 560 and 670 Mbps, all of which could have been improved, I'm sure, by further tweaking.

In tests on my Media 100 HD system, which uses a Kona 3 card for I/O, I had no trouble capturing at 2K resolution, and could easily play back four layers of 1920x1080i HD, along with 12 tracks of audio, and varying the opacity of layers in real time. Throughput is not an issue with this hardware. It will easily handle multiple streams of compressed or uncompressed HD or better, even in one of the mirrored, redundant modes.

### SUMMARY

Performance comes at a price, and peak performance in this price range is only for project oriented professionals or the independently wealthy. It does show where the capabilities, performance and prices are heading for the rest of us. Ciprico's MediaVault is solidly built and easy to integrate into any infrastructure. ATTO's Fibre Channel card is equally so.

Together, they assure easy storage sharing, as well as great performance. Both Ciprico and ATTO have excellent support departments, just in case any configuration or performance issues should arise. They respond promptly and thoroughly, as evidenced by their help (for which many thanks) in set up and testing for this review. Both companies are well worth doing business with at this financial and performance level.

*Michael Hanish runs Free Lunch, a video/audio/multimedia production house near Guilford, Vt. He may be contacted at* mhanish@sover.net.

## Leader

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disclaimer text occupies at the bottom of the screen. Our policy is that if the disclaimer text is not at least 21 lines high, post-production work must be done on the spot to make it legal—no ifs, buts, or ands. Probably 50 to 75 percent of the political ads we receive from outside sources require an increase in the size of the font.

Evaluating these spots would be a nice first test for the LV-5750.

Because the disclaimers last only four to five seconds, getting a measurement required pausing video in some fashion. First, I tried to capture a screen shot of a political ad using the LV-5750, so that I could count the lines on the text. The capture function worked, but I wasn't able to use the line select function to count the lines containing the disclaimer text. Once the signal is captured, your line selection is frozen on the line you were viewing when the capture button was pushed.

Moving along, I reverted back to my standard procedure of just stopping the server play-out of the ad while the disclaimer was displayed on the screen. Using the multidisplay on the LV5750 allowed me to view the cursor moving through the picture as I scrolled through the lines. This enabled me to see which line the text first appeared on, and on how many lines it appeared. The display was sharp, and the functions were quick and responsive.

I was very anxious to capture a screen shot and be able to treat that file like any other BMP file. This could prove to be a very valuable feature for making written reports, remote troubleshooting, or providing images for documentation. However, I ran into a problem in trying to store images via the Compact Flash port.

I wound up calling the factory for help and had no trouble in finding someone there who was willing and able to help. The factory tech supported my suspicion that my CF card was probably formatted to FAT 32, which is not compatible with the Leader LV5750.

While CF cards can be reformatted, I was unable to find someone willing to let me experiment with their camera memory cards that close to the holiday picture taking time, and couldn't test this functionality. With the price of CF cards falling all the time, it would probably be a good idea to include one along with the instrument.

My final bit of experimentation with the LV5750 involved portable operation with battery power.

I wanted to see how long the unit would operate on batteries, and borrowed a Synergistics Viper 160L lithium ion battery from the newsroom. I hooked it into the Anton-Bauer Gold Mount on the rear of the unit and set the display for multi mode.

The instrument specifications and some math suggested that the unit could be powered for about six hours; however, some eight hours later, the LV5750 was still operating nicely. Of course we all know that some batteries perform better than others.

I came away with two observations about operating the unit from battery power. First, the LV-5750 will only use the thinner three-post-mount batteries, as the larger brick versions are too thick to fit into the case.

Second, the LV-5750 does not have battery charging capability. Any sort of extended remote or field operations operation would either require a separate charger or a good quantity of charged batteries. It should be noted that Leader does not supply batteries or the needed external charger.

### SUMMARY

The LV5750 is a nice piece of test gear at every level. It's portable, seems rugged, and it has a very nice and familiar feel to it. The learning curve is very minimal and the pricing on the unit is competitive. Every time I looked at it, I kept thinking how much portable scopes have changed.

I didn't attempt to do a lab evaluation of the LV5750, but rather ran it through a few of the more common tasks associated with broadcast facilities today. It is apparent to me that this instrument can certainly hold its own when compared to many studio waveform monitors available today. The Leader LV5750 would be a nice addition to either a studio or mobile unit.

In closing, while monitoring of embedded audio is a nice item in the feature set; the next logical step would be the addition of discrete AES, or possibly even analog, audio inputs to the unit. We'll just have to see what innovations that Leader Instruments has in store for us in the future!

*Joey Gill is chief engineer at television station WPSD in Paducah, Ky. He has been with the station for 25 years and has worked in broadcasting since 1977. He may be contacted at* respond2jgill@yahoo.com.


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# Frezzi

CONTINUED FROM PAGE 60

a flashing low battery indicator and a sleep mode.

All of Frezzi's lithium ion batteries in this series are available in either of the two principal battery mounts, V-lock or Anton/Bauer. Frezzi V-lock series batteries can be charged on most Sony or IDX lithium ion battery chargers. To charge the Anton/Bauer-mount batteries, Frezzi has developed some new lithium ion chargers. The FLC-2 dual channel charger/power supply can charge two Anton/Bauer-mount batteries at a time. It handles all Frezzi lithium ion batteries.

A similar model, the FLC-2V dual channel charger, also can power a camera and charge all units in the same series of lithium ion batteries with V-Lock mounting plates. Both the FLC-2 and FLC-2V indicate charge status with LED indicators.

Frezzi also has a much more portable single channel charger, the FLC-1 travel charger. It charges all FLB series batteries, including those with Anton/Bauer and V-lock mounts. It does so by connecting to a unique built-in charge port located in the lower corner of all FLB series batteries.

## IN USE

I elected to test Frezzi's FLB 100, the 100 watt-hour battery and the smallest in the FLB series. In part, this was done to simplify shipping. I anticipated flying with them in my carry-on luggage, and the International Air Transport Association regulations and Title 49 of the Code of Federal Regulations both restrict the size (less than 25 grams) and number (two) of lithium ion batteries that can be taken aboard commercial airlines as carry-on luggage.

The FLB 100s require no additional paperwork or permits for shipping via ground, or air mail. I selected V-lock mounts in order to power my Sony DSR-570W camera.

The FLB 100 slid easily into the DSR 570W's V-lock mount and locked snugly into place. Within seconds I was good to go, but not before checking the charge level on the fuel gauge. As it turned out, the battery was less than fully charged. I topped it off with an IDX Li-Ion charger in half an hour or so.

Unlike NiCad-type batteries, partially discharged lithium ion batteries can be recharged without danger of a capacity-robbing memory effect. Hence, they can be quickly and safely topped-off, regardless of whether they're half or maybe even only 10 percent discharged, without incurring a crippling memory effect. By contrast, NiCads must first be fully discharged before recharging.

My first use of the FLB 100 was outdoors in subfreezing conditions during an intense snowstorm. The batteries were shielded from the heavy and wet snow by a thin water-resistant nylon camera cover. This covered most, but not all of the battery. It provided the battery with buffering, but did not afford complete protection against wind and precipitation. The cover may have helped keep the battery from overheating, even when kept in constant operation for upwards of an hour at time. Temperatures during that storm were not severe enough to cause cold stress; hence operating time and performance were not adversely impacted in any noticeable way.

One afternoon while shooting a weather story, I decided to test battery capacity with continuous usage, but with only intermittent recording. I left the camera in standby and power-save modes between takes for a period of more than three hours. I shot about 30 minutes of footage—15 to 18 takes altogether—and left the DSR-570 WS on for the entire three hours. The camcorder automatically goes into a power-save mode after two to three minutes in standby. Hence, for probably half of the test period, the camera was in its power-save mode, with the other half of that period divided between actual recording and record pause or standby mode.


*Frezzi FLB 100 battery and the dual channel lithium ion charger*

After some three hours and 20 minutes, the gauge showed about 20 percent of capacity remaining. Moreover, although the FLB 100 was certainly warm, I would not describe it as hot. Afterwards, I was able to fully recharge it within an hour.

I used the FLB 100s in even colder weather and didn't notice any decline in capacity. In fact, the batteries seemed to run cooler than normal, although I can't say whether there were any appreciable gains in performance as a result of the improved cooling. My overall impression was that its performance at 10 degrees below freezing was roughly comparable to performance at 5 to 10 degrees above freezing.

On one occasion I accidentally left the camera on for several hours inside my vehicle. I had been keeping it on between takes in order to be ready to shoot spontaneously. I wanted to be able to pull over, grab the camera and frame a shot with the camera perched on the window frame, or on my shoulder.

Unfortunately, on one occasion I forgot to turn the camera off after shooting and it stayed on, mostly in the power-save mode, until the battery was fully expended. It had been at around 60 percent capacity. When I discovered my oversight, I noticed that the FLB 100 was warmer to the touch than when I had used it for slightly more than three consecutive hours (80 percent exhaustion).

It also took longer to cool. From my limited knowledge of battery chemistry, I know that batteries dislike extreme temperatures, wither hot or cold, and that they perform their worst under those conditions. They can be damaged when laboring under some extreme conditions, including extended operation.

I put the overheated FLB 100 on the charger, but only after it had thoroughly cooled. Several hours later I was surprised to find the battery at only 80 percent of full capacity, so I left it on charge for another two hours without any improvement.

Nevertheless, it performed otherwise and more than exceeded my typical requirements for a short assignment. Had I been on location, relying on a car battery for recharging, this might have been a bit more problematic. Apparently by allowing the FLB 100 to fully expend itself, some damage was done to its capacity or to its ability to fully recharge. The net effect was similar to a memory effect with NiCads.

Unfortunately, despite other attempts to recharge it, results were the same. However, assuming that the FLB 100's gauge is accurate, apparently failing to turn off the camera caused the battery to overheat, causing some lasting injury to its overall capacity and operational time.

However, from my perspective, its basic functionality was not diminished. Also, it could be that when charging, the fuel gauge may read 80 percent whenever it's not fully recharged. Hence, it could be at 90 percent or more. However, since the gauge reads only in 20 percent increments, it displays 80 percent when charging, as it's below the level needed to display 100 percent. In fairness, I should note that I was not using a Frezzi charger for recharging this battery. Jim Crawford at Frezzi advises that he has seen this happen before when customers use other manufacturers' chargers with the FLBs.

## SUMMARY

Each type of battery certainly has its strengths and virtues, as well as pitfalls and limitations. Frezzi's FLB 100, FLB 130 and FLB 200 deliver plenty of capacity for their weight and price, especially when compared with NiCad bricks, which literally weigh as much as many building bricks.

The FLB 130s (not tested) are rated at 130 watts, which is a considerable capacity for their mere 2.2 pounds. The FLB 100s (which I did test), are also energy giants, but have the added advantage of not requiring a waiver of air transport regulations. This precludes carrying on the FLB 130, as it slightly exceeds the weight limit, but the larger battery could still be transported in checked luggage, as could the FLB 200.

This extra capacity of the batteries is especially useful when traveling as a solo cameraman. Higher capacity batteries mean fewer batteries are needed for an assignment. It also means that one battery can probably power a field monitor (intermittently) and other devices, for most of a day. I really liked the FLBs, as they performed so well in the cold and wet snow, providing hours of operation—impressive for a fairly lightweight battery.

With two freshly charged FBLB 100s, most 2/3-inch and 1/2-inch CCD cameras could operate for the better part of a typical day of intermittent shooting. While the FLB series of batteries aren't particularly stylish, they are well designed and are certainly durable.

These are low-frill devices, geared to delivering more capacity per dollar and per pound than any other lithium ion camera battery in the U.S. market. Any pros still using NiCads, or even nickel metal hydride batteries, would do well to give Frezzi's FLB batteries a close look.

They provide a lot of bang for the buck and for their size. I plan to add some to my kit, and feel that most pros, especially those who have to run a wireless mic and light, would be well served by giving FLB 100s, and their beefier cousins, the FLB 130 and FLB 200s, a try. Just remember to power down when not using them!

*Carl Mrozek operates Eagle Eye Media, based in Buffalo, N.Y., which specializes in wildlife and outdoor subjects. His work regularly appears on the Discovery Channel, The Weather Channel, CBS, PBS and other networks. Contact him at* eagleye@localnet.net.

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**Wohler AMP 1A**, $375; Sony PCM 7040, $3995; Sony PCM 7030, 2995; Sony PCM 7010, $750. LA 818.788.4700; NY 212.564.9933 www.tvprogear.com

**Sachtler 30 head & sticks**, $4995; Sony Cine Alta XDCAM HD PDW-F330 new demo unit, full warranty, Only $9,900; Sony BVP-50 Camera Head, $2750; BTS LDK93 w/Studio VF, Fujinon BEVM 15X lens, CCU & Paint Panel, (steal this camera), BO; Sony LDK 90 w/Studio VF, Fujinon BEVM 15X lens, CCR & Paint Panel, BO; Hitachi C2 camera w/Canon J15 lens, BO. LA 818-788-4700; NY 212-564-9933 www.tvprogear.com

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### Want to Sell

**Sony PVW/DXC-637 Beta SP camera w/PVV-3 deck**, 648 drum hrs, comes w/camera bag, filters, Anton Bauer batt mount, $2800. 208-735-1970 or 208-420-9779.

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## DIGITAL EFFECTS

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## EDITING EQUIPMENT

### Want to Sell

**Sony DVW-A500 digital Betacam editor**, $31995; Thomson TTV-3452N OEM of Sony DVW-A500 digital Betacam editor, $29995; CMX OMNI 1000E edit cntrlr, $3900; Avid 18GM drive, $350; Accom StrataSphere Spherephous, BO; Avid MCXPRESS-NT V 4.1, BO; Avid SYMPHONY V2.1 system, $6995; Discreet Inferno HD, BO; Discreet Smoke HD, BO; Sony RM-450 cntrlr, $850. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

## LENS REPAIRS

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

**Sony PVM20M4U 20" Color Monitor**, $1750; Sony PVM14M2U 14-inch Color Monitor, $1050; Sony BVM 20 F1U Monitor, BO; Sony BVM14F1U 13" Color Monitor, $1750; Ikegami TM9-1 9" Hi-rez color monitor, BO; Tektronix 1720 Vectorscope w/1730 Waveform monitor & dual case, $900; Tektronix 1725 Vectorscope w/1735 Waveform monitor & dual case (PAL & NTSC), BO; Tektronix WFM 300, $750; Tektronix 601 M Serial component monitor, $5500; Tektronix 601 A monitor, $4500; Tektronix 601 serial component monitor, $3500; Tektronix 1755a Waveform/Vectorscope dual standard (PAL & NTSC) composite & component, $2995; Tektronix VM700a, $9,000. LA 818.788.4700; NY 212.564.9933 www.tvprogear.com

## RECEIVERS/ TRANSCEIVERS

### Want to Buy

**Tektronix PDR-100 analog server**, $3800; Tektronix PRS200A 20x9GIG server, $4800. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

## SIGNAL PROCESSING

### Want to Sell

**Convergence ECH-HD large HD playout turnkey system**, $31000; Darim Vision FDSR2000 playout turnkey system, $11995; Convergence ECS-550LT Media Lite D.Co 1 chnl TV automation turnkey system, $7395; Convergence ECS-650P Digitizer Pro Media D. Co TV automation turnkey system, $39885; Chyron INFINIT! CG, $7999; Chyron MAX CG, $3690; D.Co MediaPlay CG, $2395; DaVinci 2K 3 Power tiers color corrector, BO; Blackmagic Multibridge HD-SD encoder/ decoder, $1795; Darim Vision MV401exp, $6995; Darim Vision MV410EXP, $6495; Leitch FR-6802 w/10 VSM-6801 serial DA, $3000; Tekniche Genesis 6001, $1600; Tektronix 2715, $8500; Sony HKDV501A, BO; Digital Vision DVNR1000 4x4 NR, BO; GVG M9131 SDI DA, $150; GVG 9560 PAL sync gen, $1150. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

## SOFTWARE/HARDWARE SYSTEMS

### Want to Sell

**Apple G4 933mhz with Kona SDI I/O card**, BO; Avid Symphony Nitrus, newest hardware & software, BO; Avid LVD MediaDock, $2295. LA 818.788.4700; NY 212.564.9933 www.tvprogear.com

## SWITCHERS

### Want to Sell

**Thomson 9200 8-input SDI switcher**, BO; BTS DD10 16-input SDI switcher, BO; Echolab DV7 Switcher, BO. LA 818.788.4700; NY 212.564.9933 www.tvprogear.com



**Sony 2000A portable switcher**, 8-composite inputs, fader bars, buttons for transitions & wipes, great for multi-camera shoots, gd cond, $750/BO. M Schulze, 619-644-3000.

**Snell & Wilcox Kahuna 4 M/E HD/SD switcher**, BO; GVG M-2100 master cntrl switcher, $19600; GVG 100N prod switcher, $2499; GVG IPS-110 prod switcher, $6999; Sony DVS-8000C 2 1/2ME standard def prod switcher, BO; GVG 20-TEN w/20-Ten0SA stereo audio routing switcher, $5500; GVG 7000 very large matrix w/SDI video routing switcher, $85400; GVG Series 6000 32x32 VAA w/5 panels routing switcher, $8600; Leitch 128x64 V6 Integrator w/10 panels, $31500; Leitch 16x1 routing switcher, $1100; Lighthouse K Series 32x32 SDI vdieo, AES audio routing switcher, $11000. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

## TAX DEDUCTIBLE EQUIPMENT

**Needed, 700' of 3" antenna transmission hard line**, also xmtr for TV chnl 31 & if you are changing to HDTV studio equip, we could use analog bdct equip for our not-for-profit 501-c3 org, we give tax deductible receipt for your donations. Please contact us at 317-920-1000 or email srsue@catholic-television.tv.

## PROFESSIONAL SERVICES



## TELECINE

### Want to Sell

**Thomson Shadow complete telecine suite**, $725000; GVG Spirit, BO. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

## TELEPROMPTERS.



## TEST EQUIPMENT

### Want to Sell

**Leader 5850c, $750; Leader LV 5100D, $3495;** Leader LV-7700 HD/SD rasterizor, (new) $6,500; Tektronix TSG170D Digital Composite Generator, $1500; 171 PAL sync generator, BO; TPG625 PAL pattern generator, BO; SPG 271 PAL sync pulse generator, $2250; TSG 371 PAL test signal generator, $1200; (2) TSG422 w/ ECO changeover unit, $2500. LA 818.788.4700; NY 212.564.9933 www.tvprogear.com

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Price: _____

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Make: _____ Model: _____
Brief Description: _____
Price: _____

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## TEST EQUIPMENT Cont.



**Tektronix 1720 vectorscope**, $900; Tektronix 1730 waveform monitor, $900; Tektronix WFM-601E waveform, $5200; Tektronix WFM601i waveform, $3750; Tektronix 1740A waveform/vector, $2950; Tektronix 1750A waveform/vector, $3800; Tektronix VM700A, BO. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

## TRANSMITTERS/ EXCITERS

### Want to Sell




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


## VIDEO PRODUCTION EQUIPMENT

### Want to Sell

**Darim Vision VS2010-STD Virtual Studio Video system**, $22800; Darim Vision VS2020-STD Virtual Studio Video system, $34995. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.




## VTRs/VCRs/ RECORDING MEDIA

### Want to Sell

**Panasonic AJ-HD2700P w/down converter board D5 VCR & EQ**, $22900; Sony BKFC-200 Playback systems parts, $4500; Sony BVU-950 3/4 U-Matic VTR/editor, $1799; Sony DNW-A220 Betacam edit system, $10650; Sony BVW-75 Betacam editor, $7250; JVC BR-D750U D9 digital-S editor, $3750; JVC BR-D350U D9 Digital-S plyr, $2250; Sony SRW5500 HDTV rcdr & plyrs, BO; Sony DIR1000H, new, BO. 818-551-5858 or 212-268-8800 or www.broadcaststore.com.

**Sony UVW1800 Betacam SP Recorder**, $3995; Sony BVW 75 Betacam Recorder, $4950; Sony DSR-80 DV Cam VCR, $3500; Sony SVRM-100A remote for UVW series VCRs, $200; Sony VO 9850 ?" U-matic recorder, $1500; Sony SVO5800 S-VHS Editing VCR, $1250; Panasonic 7350 S-VHS Editing VCR, BO. LA 818.788.4700; NY 212.564.9933 www.tvprogear.com

**Sony BVW 35 portable Betacam SP rcdr/plyr**, great cond w/PortaBrace case, also 3 service manuals, etc, $2500/BO; Sony 3/4" VCR VP5000, $50. M Schulze, 619-644-3000.

# EMPLOYMENT

## HELP WANTED

**Maintenance Engineer/Satellite Truck Driver:** KSBI TV 52, OKC DMA, seeking experienced Satellite Truck Driver and Maintenance Engineer. 3+ years experience in audio, video and satellite uplink required. Must be capable of performing technical maintenance and repairs on broadcast equipment, have good understanding of satellite operations and work well with deadlines. Valid driver's license required. Qualified candidates may send resume to info@ksbitv.com or fax to 405 631-7367.

## Fujinon

CONTINUED FROM PAGE 61

the wide end. This proved especially helpful when shooting with a long telephoto lens using the built-in 2X extender, and also in low light where depth of field can be quite shallow making it difficult to ascertain start and end points.

Zoom limiting operates much like any other marker function for selecting in and out points, but here these start/end points are erased once the zoom is completed. As a result, the rocker arm controls the full zoom range as soon as the "limited zoom" is completed. There is also an on/off switch for the zoom preset on the front end of the lens handle. This prevents accidentally hitting either preset button while fumbling for the quickzoom button with bulky gloves.

Naturally, the 18x7.6 has both auto and manual iris options. Many shooters often prefer to manually adjust iris levels, partly to avoid "searching." Instead they'll use a light meter, zebra bars and/or their eyeballs for referencing exposure. A very handy feature of the 18x7.6 is the momentary override button adjacent to the manual/auto iris select switch. Depressing it provides autofocus for as long as it's depressed. Once released, it holds the most recent iris value, which can then be tweaked manually as needed. This function can also be used to gauge average exposure in a contrasty scene by obtaining multiple readings from different parts of a scene, then averaging them out.

In terms of imaging, the HA18x7.6 makes it much easier to get the sharpest, cleanest pictures feasible in either HD or SD. Unfortunately, in order to meet deadlines for this review, I was only able to test it with an SD camera. Nevertheless, the video obtained was exceptionally clean, sharp, with consistently good color and with no noticeable softening at the edges or elsewhere. The same held true when using it with a 1.6x Century Optics tele-adaptor that I've used extensively with pro SD, but never with HD lenses. This was my first opportunity to test the 1.6x with an HD lens having the proper outer diameter needed to mount the Century adapter. I was impressed at the sharpness of imaging throughout the full zoom range, even with the internal 2x engaged. Even with the best SD lenses, I've noticed a slight softening at higher focal lengths and a loss of an *f*-stop when fully zoomed in. To my amazement the image remained quite sharp even at the edges, and even with both internal 2x and the Century 1.6x extenders, an excellent field test of the caliber of a lens!

### SUMMARY

With its compact size and low weight, the HA18x7.6's ideal applications are those where mobility and flexibility are paramount. This includes news, documentaries and various EFP applications, especially where space is at a premium. The lens is also portable enough to travel as a carry-on. It offers professional users a familiar and affordable transition to HD, and also lends itself to enhanced use with SD cameras and camcorders. The compact design makes it an ideal 2/3-inch camera lens to adapt for use with 1/2-inch HD format cameras such as the XDCAM HD. For owners and operators with a collection of 82/85 mm filters, adaptors and other lens accessories, the HA18x7.6 provides physical compatibility and an opportunity to verify whether all of these accessories will pass muster for HD applications. In short, this lens offers many possibilities for many applications at a relatively modest price.

*Carl Mrozek operates Eagle Eye Media, based in Buffalo, N.Y., which specializes in wildlife and outdoor subjects. His work regularly appears on the Discovery Channel, The Weather Channel, CBS, PBS and other networks. Contact him at* eagleye@localnet.net.

# TV TECH STOCK INDEX

## RF Central Acquires MSC

CARLISLE, PA

RF Central, a provider of microwave equipment to the TV broadcast industry, is buying Microwave Service Corp., which sells, leases and services microwave equipment.

"The purchase of MSC will enhance and expand RF Central's microwave repair, sales and rental services," said Jeff Winemiller, president of CEO of RF Central. "MSC is a key ingredient for future growth, bringing decades of additional broadcast experience to the RF Central family of companies and we are all excited about the new opportunities before us."

Warren Parece, president and CEO of MSC, will continue to manage the company and will also serve on the board of managers of RF Central. Daniel Shine, MSC's vice president of sales and marketing is now vice president of business development for RF Central and will have additional responsibilities for new product development.

MSC will continue to operate out of its 12,000-square foot facility in Haverhill, Mass.

## Harris Plans Cuts to Transmission Division

MELBOURNE, FLA.

Harris said broadcast revenue in its second quarter was $155 million, up 14 percent from the same period last year.

Radio transmission systems revenue was higher, led by shipments of HD Radio systems. The company also said its revenue is benefiting from the 2006 acquisitions of Leitch Technology, Aastra Digital Video and Optimal Solutions.

Sequentially, revenue increased 11 percent compared to the first quarter.

But Harris also cited weakness in its TV transmission systems business and it plans cuts there.

Broadcast orders in the quarter increased 29 percent to $158 million, compared to last year, and were higher in all business areas except TV transmission systems. Broadcast operating income was $13 million in the second quarter; operating margin was 8.4 percent.

The company said revenue growth was led by double-digit increases in the video distribution area.

TV transmission systems revenue performance was described as weak and Harris said it will cut costs. Its business summary hinted at layoffs ahead, saying it will save $10 million in fiscal 2008 through "severance and facility exit costs."

Harris top executive Howard Lance outlined the company's strategy in its financial summary, saying that in commercial broadcast and telecom, "we are utilizing strategic acquisitions along with organic growth activities to increase market share." In those businesses, recent actions by Harris "are aimed at 'changing the game' and positioning Harris as the clear supplier of choice for global customers."

The parent company also released financials. Harris Corp. said revenue for the second quarter of fiscal 2007 increased 21 percent to $1.016 billion. Sequentially, revenue was up 7 percent, "compared to a strong first quarter."

## Avid Reports Q4 Revenues

TEWKSBURY, MASS.

Avid Technology reported revenues of $239 million for the fourth quarter of 2006, down from $245 million for the same period in 2005.

The company said it lost $52.6 million during the quarter, compared to an $18.4 million profit in Q4 2005. It attributed the loss to a $53 million write down from its acquisition of Pinnacle Systems in August 2005 and a $3.2 million restructuring charge as a result of reorganization of its Professional Video and Consumer Video segments during the quarter.

Avid Technology CEO David Krall called the latest revenue results, as well as overall revenues for 2006, "mixed."

"While our big deal backlog continued to build each quarter throughout the year, including Q4, bringing us to record levels, recognizing revenue out of this backlog continued to be unpredictable," Krall said. "This led to a shortfall in our video business for the fourth quarter."

Avid's audio business saw a healthy upturn in 2006, company executives said and consumer video product sales in Europe were also strong. But Krall warned that, while the company is making changes to boost its bottom line, don't expect results too soon.

"We have taken a number of steps to position all of our businesses more favorably for the coming year, including a cost restructuring in our consumer business which took place in Q4," Krall said.

## NAB Hires New Exec to CFO Post

WASHINGTON

Michael S. Williams will be handling the money at NAB.

The association named him chief financial officer and executive vice president of finance and operations. Williams, 46, was chosen after a search process conducted by an outside firm.

Past positions include executive vice president at the Motion Picture Association of America and executive vice president, finance and operations at the Recording Industry Association of America. NAB said at RIAA Williams helped create SoundExchange, which represents artists and record companies focused on accurate distribution of royalty payments.

## Broadcom Wins Qualcomm Patent Suit

SAN DIEGO, CALIF.

A federal jury in San Diego found Broadcom Corp. had not infringed on two patents for digital video compression owned by Qualcomm Inc., although it ruled the patents are valid.

The two patents relate to techniques for compressing digital video signals for more efficient storage or transmission. Qualcomm alleged that Broadcom had infringed on its patents by using its technology in Broadcom chips for use in high-definition set-top cable and satellite receivers and other HD video equipment.

The nine-member jury reached its unanimous verdict in January after six hours of deliberation.

"We are obviously very pleased and very grateful for this jury's diligence in working to arrive at the truth, even when presented with some very complex and intricate engineering testimony," said David A. Dull, Broadcom's senior vice president and general counsel.

This is the second win for Broadcom in an ongoing battle between the two companies. Last year Broadcom won a case involving the U.S. International Trade Commission that ruled Qualcomm's cellular baseband chips infringe on a Broadcom patent.

Qualcomm said the latest verdict will have no impact on its existing licensing business and even declared a partial victory when the jury ruled its patents valid.

Broadcom is headquartered in Irvine, Calif., and makes semiconductors for wired and wireless communications. San Diego-based Qualcommn develops digital wireless communications.

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