

a great deal of attention. The stereo convergence was controlled remotely through special mounts.

Camera mounts appear to have been influenced by the shrinking size and weight of many cameras. That has allowed at least six brands to offer telescoping jib or crane arms this year. There has also been an increase in the number of tower and remote-tracking camera-mount brands. For larger camera/lens combinations, Vinten's Vector 950 panning head offers a digital readout for repeatable balance settings.

As small, lightweight, and inexpensive as professional video cameras become, their numbers are still dwarfed by the number of mobile telephones with video-capture capability. Chyron's WAPSTR product, introduced in the past year, is one designed to allow still and moving pictures from mobile phones to be integrated into broadcast video.

LED lighting products continue to be offered by many

brands. This year, Rosco's LitePad joined the earlier ARRI Sky Panel as a flat-panel, thermally cool, soft light source. Ocean Optics introduced the SeaChanger, a color changer for lights, based on rotating dichroic-filter disks instead of gels. It does not require fans for cooling.

Much simpler optics are used in the vfgadgets.com EyeDirect system. Essentially a periscope on its side, the system allows the inexperienced to look directly into a camera's lens and see human reactions. It is similar to the Interrotron used previously by director Errol Morris, but without need for additional electronics.

Two manufacturers also introduced new techniques for monitoring camera output signals. DK Technologies offered a "spinner" display of histograms instead of levels against time, and Leader's CineLite offers analysis of the brightest and darkest points in a picture, for maximum dynamic range during shooting.

Post Production



Phil Mendelson

Mendelson has over 35 years of experience in the entertainment industry in technical systems development, design, and operation. He has conceived, designed, and built several major recording studios and video facilities, and managed their technical performance.

Mendelson began his career as a public radio producer, production engineer, and on-air personality in his birthplace of Detroit, MI, while attending Wayne State University. Moving to Los Angeles in 1974 and transitioning to the music business as an audio engineer

By Phil Mendelson, Ascent Media Creative Services Group

Digital Acquisition and Dailies

The acquisition field has widened considerably, and now includes several cameras that produce some form of file-based data, rather than HD streams. Currently, there is no standardization in the format and handling of this data, which will present challenges in Post in the development of cost-effective systems that can adapt to any of these formats.

Dalsa, RED, and Arri are among the manufacturers producing data-based cameras.

S2, Codex, and Color Space all produce field recorders that can record the output of many digital cameras, including and especially HD stream output, though many cameras, such as those from Grass Valley, RED, and Panasonic all support on-board solid-state media.

The Codex and S2 recorders facilitate the transformation and backup of on-location recordings. The Codex, for example, can output preview quality debayered image sequences from the Dalsa camera, and transform them to a number of deliverables, such as digital media for review, and media to the cutting room. This will have the effect of moving more aspects of the Dailies process onto location.

Established color management tools such as the Grass Valley Luther and Filmlight Truelight systems can be used to facilitate consistent visualization practices and creative looks from location to dailies, through finish.

and recording mixer, he worked with many well-known recording artists, acquiring the basis of technical skills that would further his growth as an entertainment technologist.

Making the transition to film and television post production in 1985, he was integral to the adoption of emerging digital production technologies.

Currently chief technology officer for Ascent Media's Creative Services Group, Mendelson oversees technology for the post-production companies comprising the Group.

Film scanning

Film acquisition continues to retain a large share in episode television, feature film, and commercial work. Established Digital Intermediate workflows for feature film are migrating to commercial and television work. These workflows are file-based end-to-end.

The Arriscan (from Arri) and Northlight (from Filmlight) scanners support scanning to files without video support and offer pin registration. Lasergraphics has just introduced The Director, their entry into this arena. Though relatively slow (2 to 9 frames/sec at 2K resolution), they are cost-effective enough to operate in multiples to increase throughput.

The Grass Valley Spirit 2K and 4K can be purchased with or without video support, to be used as a conventional Telecine, or data scanner, and can scan 2K data in realtime.

Mirroring digital camera acquisition workflows, scanning film to data represents a pluggable front end to the emerging file-based deliverables chain.

Commodity Computing Platforms

The evolution of commodity PCs continues to have a deeply transformative effect. These platforms now offer multicore CPUs with PCI Express architecture and can aggregate eight cores at price points that are radically changing the cost structure of high-end desktop compositing, color correction, and finishing. In addition, image-processing applications can take advantage of GPU hardware processing.

In the past year, Autodesk has transitioned their Discreet products to such a platform, as well as to the Linux OS, offering performance gains over legacy "big iron" hardware, costing many times more. Big iron vendors like SGI no longer produce such hardware and have repositioned themselves in the computing market accordingly.

We'll always want more power, yet the critical interactivity that is necessary for most short turnaround Post applications with software-based tools and inexpensive commodity graphics is more easily attained than ever before.

Infrastructure: Storage and Networking

InPhase Technologies intends to begin delivering their first-generation Holographic storage device. This unit utilizes a 5 1/4 in. disk that will currently store 300 Gbytes with a bandwidth of 20 Mbytes/sec, offering random access and access times far better than that of tape storage. In the coming years, it is expected that both capacity and bandwidth will approach a target of 1Tbyte at ~1Gbyte of bandwidth.

Cost/Performance ratio continues to improve in high bandwidth fibre channel and SATA storage. Availability of high-performance solutions at a cost of \$2,000 to \$6,000 per TByte for direct attached and SAN integrated storage is also applying pressure on those vendors offering proprietary direct-attached solutions for their desktop products. SAS technology is emerging as a high performance, lower cost alternative to fibre channel, as applied by Autodesk in their Stone storage systems, and supported by other vendors as well.

Infiniband is now finding its way into both storage and desktop products as well. Data Direct Networks offers the 9500 controllers with Infiniband support. As a clustered host interconnect, Infiniband can be found in DaVinci's Resolve color corrector, Autodesk's networked rendering and file sharing, and in Isilon's IQ clustered NAS storage products.

Sony continues migration of the SRW VTR platform to a datacentric model with announcement of the SRW5800, which will eventually support 2K/4K file-based operation. Initially, it will support 880 Mbit/sec modes, currently only supported in the SRW-1 field recorder, allowing greater flexibility in HD 4:4:4 and vari-speed work in Post.

Color Correction and Finishing

A number of platforms have emerged to address the file-based finishing market, offering wide feature sets and leveraging the emergence of four and eight core commodity PC platforms. Scratch, from Assimilate, offers an integrated yet modular toolset, permitting the user to purchase only the features that are needed.

Apple Final Cut Studio with Color offers a fully integrated desktop editorial and finishing solution in SD and HD. Their introduction of the ProRes codec offers a new alternative for economical HD desktop editorial for both offline and finishing and can be run on up to 8 cores on the Mac Pro platform.

Software-based color correction platforms for Digital Intermediate have come of age, as feature sets and available computing power reach parity. Nucoda from Digital Vision, Lustre from Autodesk, and Baselight from FilmLight, have come to maturity, and with Resolve from DaVinci, which leverages software programmable hardware from Aspx represent the high end in resolution-independent color correction.

The ability to acquire and record at full color depth suggests the advantage of maintaining it throughout the post-production chain, and there is now established demand to do so. The Sony SR tape format supports this in a video workflow.

The DVS Clipster now offers 4K image playback capability with DPX file support, but bridges video and file-based workflows with 4:4:4 support and hardware-based scaling.

Spectsoft's Rave HD Disk recorder offers DPX file support with video I/O, and list import on a Linux platform, with internal SATA RAID storage, all with 4:4:4 support.

Monitoring

The CRT in 2007 is essentially dead.

Plasma, LCD, and various projection technologies all contend for its replacement.

In reference grade monitoring, LCD technology is evolving, although dependent upon a small number of manufacturers developing this technology for the consumer market. In fact, reference grade LCD monitoring is indirectly beholden to and driven by consumer demand.

Currently, all offerings have panels with a bit depth of 8, which is inadequate in critical reference applications requiring high dynamic range and deep blacks. They do provide 1920 x 1200 native pixels, which exceeds the effective resolution of a reference grade CRT. Ten-bit displays are expected to arrive before the end of 2007, just as they are already arriving in the consumer market. In addition, backlight technology is moving from cold cathode to LED, which will improve performance and color gamut.

Cinetal offers an 8-bit, 24 in. unit with the above attributes, and incorporates automatic calibration, Dual DVI and Dual link HD-SDI inputs and outputs, with the ability to inline 1-D and 3-D LUTs to the display.

Sony is expected to roll out a 10-bit unit before the end of the year. This will be a 23 in. unit, with larger ones arriving in 2008 and is intended to be their replacement for the popular BVM series of CRT-based reference monitors. eCinema Systems, Frontniche, TV Logic, and Tamuz all have similar offerings.

In larger viewing environments and those requiring compliance with DCI Digital Cinema specs, DLP projection technology is well established, with Barco, Christie, and NEC leading the way.

2K D-Cinema workflows demand native display of 2048 horizontal pixels, as well as color gamuts beyond that of Rec. 709, and LCD technology cannot currently deliver without scaling or repositioning.