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for Digital Content
Professionals*

ComputerGraphics^{World}

November 2004 www.cgw.com

Pumped Up

Pixar's superheroes gain muscle and mobility for *The Incredibles*

Must-See 3D

Father of the Pride hits prime-time TV

Global Animation

International shorts display diversity

Comic-Book Look

Game developers revive a classic style

PennWell

Rendering without

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The new Intel® Extended Memory 64 Technology (Intel EM64T), enables 64-bit memory addressability for greater application flexibility. Enhancements to Intel Hyper-Threading Technology are designed to improve the performance of multithreaded applications, and expanded Streaming SIMD Extensions 3 (SSE3) Instructions improve thread synchronization for better system responsiveness in areas such as media and gaming.

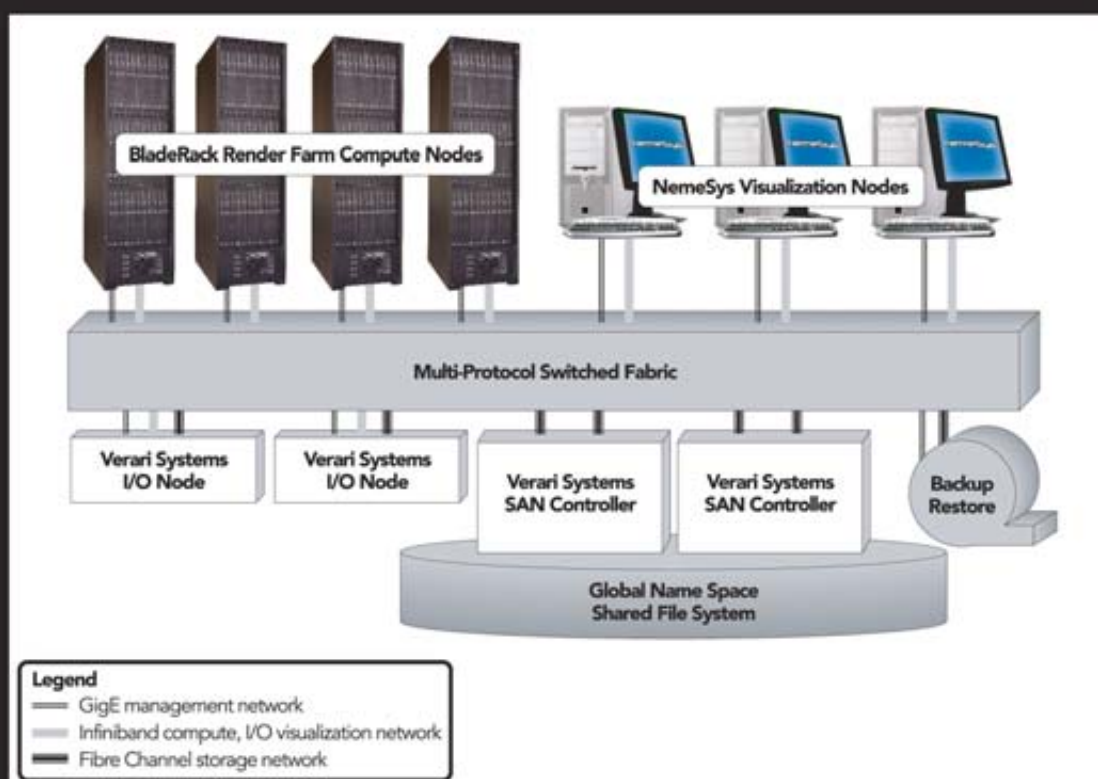


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It's nice to be recognized. We know because the Academy of Motion Picture Arts and Sciences® was nice enough to recognize our Maya® software with an Oscar® for Scientific and Technical Achievement. So we would like to recognize a milestone in the CGI movie industry – Doug Chiang's incredible vision *Robota* – and the awards it has received thus far. We are proud that *Robota* was Made in Maya and to be involved with Sparx* in helping to bring such inspiring imagination and creativity to life. Visit www.alias.com/awards to view and learn more about *Robota* and other examples of award winning creativity Made in Maya.



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Ex-superhero Bob Parr (aka Mr. Incredible) gets dynamic muscles, extreme moves, and an edgier look for *The Incredibles*. For more, see pg. 18.

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**Phil
LoPiccolo**
Editor-in-Chief

Workstation Watch

Last month, *Computer Graphics World* presented the latest installment of its Webcast Technology Series on Next-Generation Workstations. Our expert panel featured Alex Herrera and Jon Peddie of Jon Peddie Research, who cited data from their new "Workstation Report" as they examined the current landscape and peered over the horizon at tomorrow's market and technologies. In case you missed it, here's an annotated summary of the presentation and the Q&A that followed, which you can access in their entirety at www.cgw.com.

Traditional Workstations: It used to be that workstations could be distinguished from PCs by just about every metric—the vendor, the operating system, the chips, boards, and buses. SGI, Sun, HP, IBM, and DEC were basically the only shops in town; Unix was the only option for operating systems; Windows was not viable 10 years ago; and Linux was just in its infancy. But what used to be a market made up of nothing but proprietary architectures running proprietary operating systems is no more. Of the 1.6 million workstations sold in 2003, nearly 90 percent were not proprietary, but PC-derived, that is, based on technology commonly found in PCs, namely IA-32 Pentium 4, Xeon, or mobile Pentium chipsets. Today, the remaining traditional proprietary workstations have been relegated mainly to vertical niche applications that continue to decline year to year.

Is it a Workstation or PC? Given this evolution toward PC-derived workstations, it's becoming more difficult all the time to distinguish between workstations and PCs. One way to differentiate the two is to designate something a workstation if it offers added value for a premium price. That value could be in the form of hardware—such as a professional branded graphics card or ECC (error-correcting code) memory—or it could mean that the vendor simply sank more hours into certifying the box for specific professional ISV (independent software vendor) applications. What's interesting is that for added benefits such as these, the cost difference can be less than \$200.

Why Buy a Workstation? If a professional user can get some amount of improved productivity out of a workstation, whether by increasing throughput or quality or by reducing the chances of downtime, then the premium paid is certainly worth it. For instance, if you're working on a mission-critical project, then having ECC memory to protect against corrupted memory can be invaluable. On the other hand, if you use your machine to play games, then ECC memory may not be worth the expense—or the accompanying sacrifice in system performance—to protect against corrupted data,

unless, of course, you're a serious gamer and have a really good score going.

Midrange Machines: At the midrange level of the workstation market and above, separating workstations and PCs is more straightforward. Dual processors, the width of the PCI Express interface, other specialized or high-bandwidth I/O options, and the amount of storage and memory are key separators. Midrange workstations may also build in more reliability, with features such as redundant RAID memory, multiple fans, multiple power supplies and, at the higher end, features like chip kill, which provides redundancy across the DRAM chips, so if one chip fails,

continued on page 6

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LIGHTWAVE- THE CHOICE OF AWARD WINNING ARTISTS



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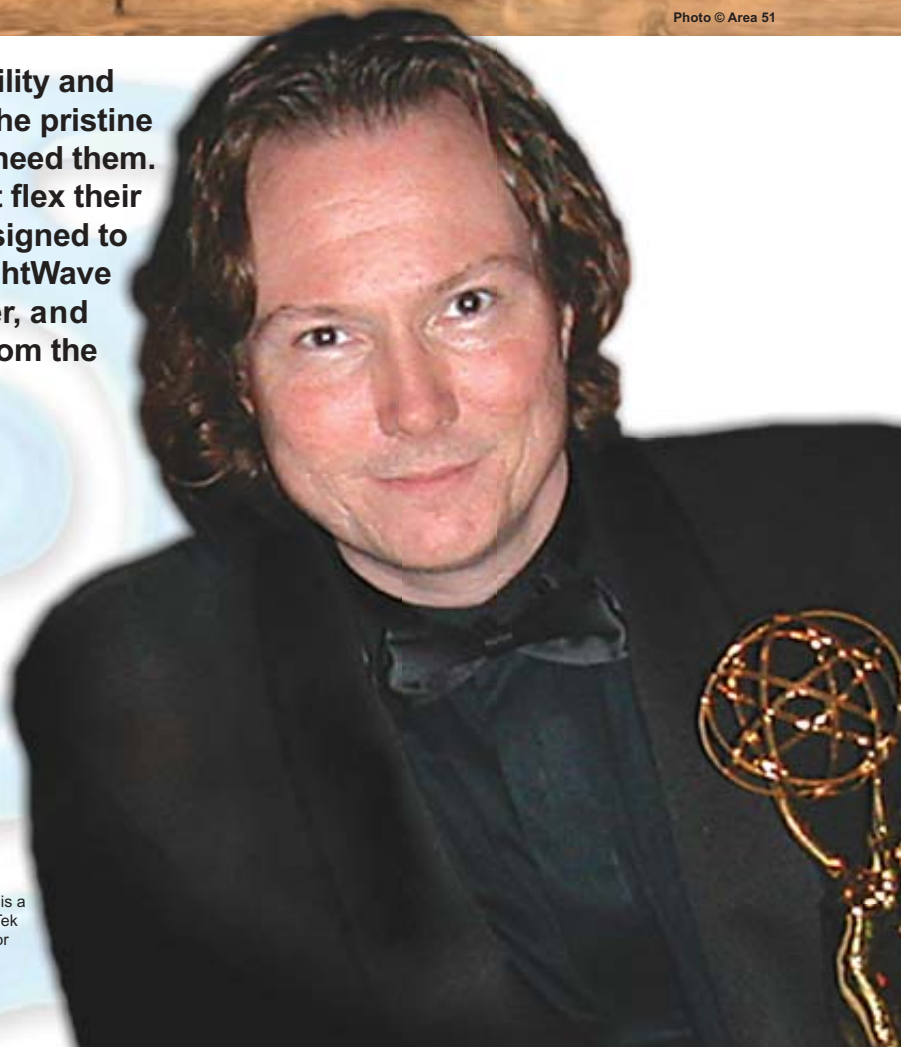
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continued from page 4 the memory as a whole won't be corrupted. Alas, in a relatively short amount of time, several of these features will trickle down to the PC.

The Big Three: Dell is clearly the workstation market leader, shipping about 45 percent of the 2003 units, and an even larger share for the first half of 2004. Because of Dell's dominance, the other vendors tend to avoid head-to-head competition with the market leader and differentiate themselves in something other than just price. For example, Hewlett-Packard, which accounts for 23 percent of the units sold last year, offers Intel-based workstations, as does Dell, but HP also markets proprietary PA RISC-based machines. And IBM, third in unit share with 14 percent, is the only one of the "big three" vendors that currently markets an AMD Opteron-based workstation.

Other Top-Tier Suppliers: For Sun, which ranks fourth among workstation vendors with an 8-percent share of units sold, the good news is that it continues to gain ground in the market for the traditional proprietary machines. But the bad news is that this segment is declining faster than Sun can take in new business. Still, there's a lot going on at Sun that's encouraging: a deal with Fujitsu to share development costs for SPARC, a new line of Java workstations based on the Opteron CPU, and an ability to run not only its proprietary Solaris operating system, but also Linux. Ranking fifth, Fujitsu-Siemens, with a 4-percent share, differentiates itself from Dell and the other vendors primarily in terms of geography, with its strong presence in Europe as well as Asia through its sales partner Fujitsu Japan. Finally, SGI, with a 0.4 percent share, still markets workstations based on MIPS CPUs and the company's Irix OS that tend to be at the very high end of the spectrum. But in many ways they're not as much a workstation vendor as a "solution provider," searching out vertical niches, such as for national labs and government accounts, that need a lot of computer power, bandwidth, and storage. And SGI offers its workstations as one of the tools to address those applications.

Operating Systems: Windows is the overwhelming operating system choice of the big two professional application bases, DCC and CAD, and it promises to remain number one for the foreseeable future. In fact, the next version of Windows, code-named Longhorn, is not expected to be ready until sometime in 2006. Elsewhere, the once-rising star, Linux, seems to be losing some of its luster as being the "savior" from having to use Windows from Microsoft. Its roughly 10-percent market share doesn't appear to be growing very quickly. In fact, you could argue that Linux is doing more to erode the Unix base than the Windows base, since customers who have been tied to proprietary platforms are seeing it as a viable alternative to help them migrate away. Regarding proprietary operating systems, Sun looks at Solaris as a strategic part of its workstation future, but the same doesn't hold, at least not to the same degree, in terms of how HP, IBM, and SGI view their proprietary operating systems.

PCI Express: The most disruptive new technology is PCI Express, which replaces the long-standard parallel bus interface

and relies on serial communications to increase the bandwidth between PC motherboards and peripherals. In June, Intel supported PCI Express on its Pentium 4 and Xeon processors. Other suppliers, such as AMD and Apple, will have to move quickly from the AGP standard to PCI Express, to ensure they have access to the latest graphics from the likes of 3Dlabs, ATI, and Nvidia, which have also announced support for the new standard.

The Gigahertz Race: The race to speed up the processor clock rate is over, and it was the vendors that said so. AMD started with a numbering scheme that dropped the clock frequency from the model number, and Intel did the same earlier this year. The move now is toward multicore processing. Rather than trying to push clock rates and extend architectures to squeeze that last bit of parallelism out of a single thread of execution, the industry is focusing on implementing multiple CPU cores on a single die to process multiple threads of instructions simultaneously.

Dual-Core Processors: Mainstream hardware vendors took the first step toward multicore processing by introducing dual-core processors. At the end of 2002, IBM was the first to market a dual-core processor, its 130 nanometer (nm) Power 4 chipset. Early this year, HP and Sun both introduced 130nm dual cores, the PA RISC and Ultra SPARC 4, respectively. AMD and Intel waited for 90nm technology to arrive before making the transition. AMD introduced a dual Opteron chip a month or so ago, while Intel just recently demonstrated a dual-core processor. Even though Intel entered the market last, it should overtake everyone else's dual-core processors soon, and by a wide margin. In fact, Intel says that it's ramping up dual-core production, and by the end of next year, it expects to ship dual-core chipsets for at least 40 percent of desktop processors.

Chicken-and-Egg Cycle: In terms of software for multiprocessor systems, the problem with ISVs has always been that they won't develop an application for a technology, in this case multiprocessor systems, unless there's a large enough installed base of potential users. But this time, the hardware companies—in particular, Intel, with its "virtual dual-core" HyperThreading—have broken that chicken-and-egg cycle and have started to populate the market with multiprocessor systems. Now they can point to an installed base to induce the ISVs to come forward with new multi-threaded applications.

Multi-Threaded Software: The task of creating multi-threaded software is non-trivial. ISVs have to reexamine code—that, in some cases, is a decade old or older—find opportunities for branching linear code, split the workload over multiple processors, recompile it, re-issue it, remarket it, and so forth. Unfortunately, ISVs are not rolling in cash right now, so these are judicious decisions they have to make. Therefore, it's still going to take time, perhaps three to five years, before we'll see a full spectrum of multi-threaded professional software applications. In any case, we have to give credit to the platform builders who held their nose, jumped in the water, and said, "C'mon guys, we're going multiprocessing." ■■

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display
products

LightSpace Technologies Premiers DepthCube

LightSpace Technologies has unveiled the DepthCube Z1024, an improved version of its 3D volumetric display.

To present physically deep 3D images, the DepthCube Z1024 projects a series of images at high speeds, of up to 1500 frames per second, into an array of liquid crystal shutters. The solid-state display system combines 20 display planes at 1024x768 resolution and patented multi-layer, anti-aliasing technology to provide high-resolution, true 3D images with more than 15 million voxels in 32,000-plus colors.

Among the latest improvements to the DepthCube Z1024 are an expanded multi-planar projection volume, higher contrast, increased sharpness, and a brighter white point. Now shipping, the DepthCube Z1024 includes a software development environment complete with an OpenGL interceptor. The Open-GL interceptor enables the capture of 3D images in real time from virtually all 3D software programs. The DepthCube Z1024 is designed for professionals who need to convert 3D computer data into 3D images rapidly. —Courtney E. Howard

■ **LightSpace Technologies;**
www.lightspacetech.com



products | video card

ATI Launches All-In-Wonder Card

ATI Technologies targets multimedia entertainment applications with the release of its All-In-Wonder X800 XT video card. Well suited to video editing and gaming enthusiasts, the new add-in video card is based on the company's Radeon X800 VPU. In addition to Radeon X800 graphics technology, the card boasts the VideoShader HD advanced video-processing engine, Serious Magic Visual Communicator, support for high-definition

and wide display formats, a version of Pinnacle Studio 9, and 16 parallel pixel pipelines.

The X800 XT offers DVI-I and VGA connectivity in a single-slot configuration. The new release ships with Multimedia Center Version 9.02, a software suite for creating a multimedia experience, and Matchware Mediator 7 for combining text, pictures, videos, and sounds in the production of presentations, Web sites, streaming video, and Macromedia Flash files. Now available, the All-In-Wonder X800 XT is priced at \$499.

In other company news, ATI's graphics cards and technology have been selected to power notebook computers from such makers as Acer, Fujitsu Siemens Computers, and Toshiba. And Acer has chosen the

Mobility Radeon X600 graphics card to drive the Acer Aspire 1800.

Reportedly the industry's first PCI Express-based notebook PC, the Acer Aspire 1800 is targeted at mobile professionals in the digital media, content creation, and 3D gaming markets.

Fujitsu Siemens Computers' Amilo Pro V7010 professional notebook takes advantage of ATI's Radeon 9000 integrated graphics platform (IGP) technology. At the same time, Toshiba has incorporated Radeon 7000 and Radeon 9000 IGP technology in four new A-series Satellite notebook computers designed for high-end performance and content creation. Moreover, the ATI Mobility Radeon 9700 is employed in the Toshiba Satellite P10-824 notebook computer. —CEH

■ **ATI Technologies;** www.ati.com



Streamload Service Provides Online File Storage and Delivery

Streamload has introduced a new online service targeted at game developers, video specialists, and graphic designers.

Built on proprietary storage technology, Streamload provides professionals with a secure, online digital library, as well as tools for delivering and accessing large-size files in a wide variety of formats. The Streamload service enables users to send, receive, access, store, and stream digital media and data files—including graphics, photographs, video recordings, and MP3 files—of virtually any size via any Internet-connected PC.

Well suited to remote work groups, Streamload can send files of any size to an e-mail address, without concern of having the deliveries

denied as a result of attachment size limits. In addition to the storage and remote download of large files, Streamload offers fast file format conversion to optimize the file-transfer speeds. Streamload's user interface is designed with action buttons, drop-down menus, and intuitive icons to aid in ease of use. Aside from a PC with Internet connectivity, the new hosted service requires no special hardware or software.

To date, Streamload manages more than 300TB of data, consisting largely of digital video recordings,



MP3 files, and photo collections.

Streamload subscription plans range from Basic, offering 1GB of downloads each month for \$44.95 a year, to Platinum, with 60GB of downloads each month at a cost of \$399.95 per year. —CEH

■ **Streamload;** www.streamload.com

Vizrt Debuts 2D Virtual Studio Solution

Vizrt has introduced Viz|Ibis, a new 2D virtual studio package, as well as enhancements to its Viz|Engine 3D rendering software.

An entry-level program designed for virtual studio production, Viz|Ibis is designed to be easy to use, thanks to a dedicated, intuitive user interface, as well as simple to install, requiring only the calibration of camera lenses. In addition to the company's Viz|Engine 3D renderer, Viz|Ibis includes Viz|IO, a studio configuration and calibration utility for control and connectivity among all studio devices.

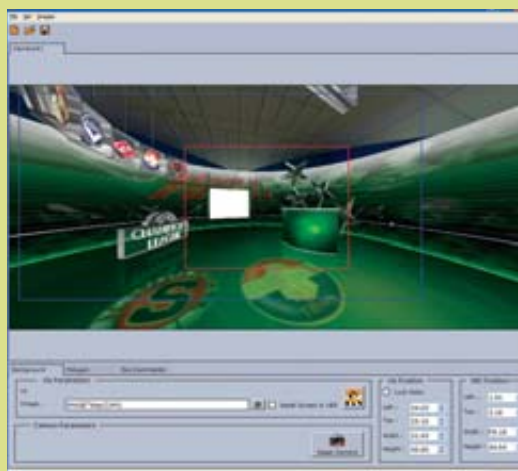
Pre-produced background images—including live or taped video, and those rendered with either Viz|Engine or 3D software from such makers as Discreet, Alias, and Softimage—compose the virtual backdrop and follow the pan, tilt, zoom, and focus of

the camera to simulate movement. In addition to offering a variety of wipe effects, Viz|Ibis supports virtual blue-screen production and video, image, and clip polygons.

Vizrt also announced that it has teamed with Nvidia to enhance its Viz|Engine renderer. Viz|Engine enables the production of realistic, complex, high-quality HD graphics in real time with readily available PC workstations, rather than requiring a high-end Unix system. With the addition of Nvidia's Quadro FX 4000 and FX 4000 SDI graphics boards, Viz|Engine boasts rendering performance increases of up to 1000 percent, as well as enhanced visual capabilities via vertex and pixel shaders.

Now available, the upgraded bundle includes Nvidia Quadro FX graphics, Viz|Engine software drivers, and new shader-based plug-ins. —CEH

■ **Vizrt;** www.vizrt.com



HD Update

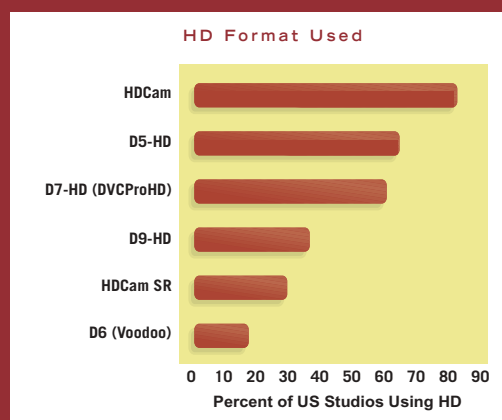
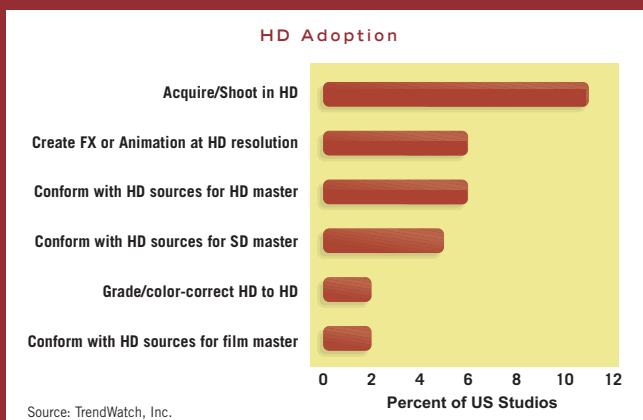
HD video production remains a topic of intense debate among video professionals and industry suppliers, and for good reason: Confusion reigns supreme regarding HD formats and quality levels. One need only walk around an industry trade show to see that there are many flavors of HD available. And although HD use in the industry is growing, a common definition of what HD is and is not has yet to be commonly understood.

Despite the chaos, at the beginning of this year, some 20 percent of US visual effects and dynamic media studios were working with HD, with a greater number of independent filmmakers, post houses, and production companies using it than other types of studios. That said, of the effects and animation studios that create content at HD resolutions, fewer than 25 percent acquire and shoot in HD.

It would be easy to say that “merely” 20 percent of

studios are using HD, but we were surprised that even this percentage reports using the technology, given its historically slow adoption rate. Also noteworthy was that of the studios currently using HD, nearly 80 percent say that their HD production capabilities are a key new business tool for 2004.

In terms of popular HD formats, by far the greatest number of HD users (more than 80 percent) report that they use the HDCam format. Of studios that believe that their HD production capabilities are a new business tool, all use the HDCam format, 75 percent use the D5 HD format, and almost 50 percent use the D7-HD (DVCProHD) format. —By Jim Whittington, principal of market research firm TrendWatch, Inc., Mill Valley, CA. All data from TrendWatch's Visual Effects/Dynamic Media Report, Winter 2003–4 and Summer 2004 issues.



In Brief

Alias Systems (Toronto, Canada) has completed its acquisition of **Kaydara** (Montreal, Canada). Alias also announced its plans to begin shipping Alias MotionBuilder 6 in the coming months. **Corel** (Ottawa, Canada) has announced its intention to acquire **Jasc** (Minneapolis), developer of the Paint Shop line of image-editing software. **DAZ Productions** (Salt Lake City) has acquired Bryce, the award-winning 3D landscaping and animation software, from **Corel** (Ottawa, Canada). DAZ anticipates not only launching new versions of Bryce for the Macintosh and Windows platforms, but also enabling users to bring existing DAZ 3D content into Bryce. **DreamWorks** (Los Angeles) has revealed plans to separate its animation unit, **DreamWorks Animation** (Glendale, CA), from the parent company, which was founded by Steven Spielberg, David Geffen, and Jeffrey Katzenberg in October 1994. In forming a new public company that will focus on producing CG movies, DreamWorks Animation plans to offer 29

million shares of Class A common stock, with the goal of raising roughly \$700 million in its initial public offering. Boston-based **Cecropia** has formed a new animation and production studio in Orlando, for which it has hired Walt Disney Feature Animation alumni and other film-industry veterans. For its work on *Battlestar Galactica*, **Zoic Studios** (Los Angeles) will serve as the effects team for a *Battlestar Galactica* TV series scheduled to premiere in January 2005. John Lockwood and Steve Street, formerly of **Cinesite** (Europe), have formed **Machine**, a new film effects house in London. Machine will concentrate on delivering digital visual effects for motion pictures, high-end TV spots, and broadcast. **Charles River Media** (Hingham, MA) has contracted **Raven Tales Productions** (Vancouver, Canada), the animation studio responsible for the *Raven Tales* animated TV show, to develop a how-to book designed for filmmakers, game developers, multimedia producers, and students.

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viewpoint
Video

Hardware-Enhanced Editing

By Jeff Sauer

One of the most exciting trends in digital video editing this year has been the facility to do high-quality work without needing special capture or processing hardware (see “Beyond the HD Hoopla,” July 2004, pg. 8). It’s a liberating promise: Take a camcorder and a computer, even a laptop, connect them by FireWire, and you’ve got a full-blown editing station for the home, the road, or any cubicle in any creative organization.

Of course, there’s more to the story in today’s evolving editing world. As real as the “software-only” trend is, there’s also no shortage of news coming from hardware companies. After all, for about as long as digital video and non-linear editing systems have been around, there has been a tug-of-war between whether hardware or software should solve problems for the most demanding video professionals.

Today, cutting-edge hardware from companies such as AJA, Blackmagic Design, Bluefish444, Matrox, and Pinnacle Systems offers capabilities that go far beyond the power of just the system CPU. More I/O possibilities, more real-time functionality, more layers, higher quali-

ty images, and overall greater productivity are among the benefits of the dedicated hardware that you might think you can do without.

Simply put, it’s a cycle. Over the years, hardware companies have led the push from off-line image quality to finishing, from compressed video to uncompressed, and from off-line rendering of all effects to real-time, multi-track editing. As processor speeds have increased, editing interface companies such as Adobe and Apple are beginning to provide each of these functions “in software,” seemingly negating the need for hardware. But, they’ve only driven the hardware companies to find more power and offer more features and functions.

Similarly, the trend toward editing with just software and a CPU started shortly after the first FireWire-equipped DV camcorders arrived in the middle 1990s. Back then, the promise was to losslessly import DV-compressed footage over FireWire, edit it using just the power of the system CPU, and output it back to DV tape over FireWire or compress it to another digital format. Of course, there were almost no computers that came with built-in FireWire ports and, at a minimum, you needed a FireWire I/O card. Many were quite inexpensive, but it wasn’t long before companies such as Matrox and Pinnacle Systems started putting a DV codec on the expansion card to off-load the system CPU and to offer real-time dual-stream editing.

Déjà Voodoo

Today’s HD transfer over FireWire from Panasonic’s new AJ-HD1200A high-definition deck is similar to what was done in the early days of DV, except that the amount of data is higher and the codec has been optimized. But CPUs are faster now, so the same sans-hardware promise extends to transferring and editing compressed HD footage. Apple announced this first, but PC vendors aren’t far behind.

What’s left for the hardware companies this time? It begins with I/O and being able to work with a variety of formats. Thus far, FireWire has been used to move only DV, and now DVCProHD, data. In addition, several editing companies now will support HDV transfer and editing, and that should become even more prevalent as more HDV format camcorders appear on the market during the next year. Still, those are all compressed formats, and there’s another clear trend in the production industry today: working with uncompressed digital video. That trend is especially true when video editing collaborates with the graphics community on animation and motion graphics.

Even for simple uncompressed I/O, you’ll need extra hardware. The good news is that

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There's been a tug-of-war between hardware and software editing solutions

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the hardware isn't very expensive, at least by historical measure. AJA's Kona 2 card and Blackmagic Designs' DeckLink HD Pro both cost less than \$2500, and both offer uncompressed standard-definition and high-definition SDI I/O, as well as real-time analog component-out for real-time output to an HD-capable monitor for accurate preview of the work. Both also offer 12-bit 4:4:4 image processing and dual-channel editing support.

Moreover, AJA and Blackmagic Design work seamlessly with Apple's Final Cut Pro, expanding Apple's "software-only" support of DVCProHD to include uncompressed HD and SD support. AJA's Kona 2 even accelerates DVCProHD processing by off-loading part of the coding process from the CPU, allowing the editor to work with more real-time layers, just as some of those early DV acceleration cards did. Blackmagic Design's DeckLink HD Pro works with both Final Cut Pro on the Mac OS and Adobe Premiere Pro on Windows.

Helpful Hardware

Even with the march forward in CPU power, expansion hardware can still bring plenty of functionality to the table simply in terms of pure strength. Digital video, especially in higher resolutions, but even at standard definition, carries such an enormous volume of data that even today's top hyper-threaded CPUs have limitations in terms of meeting the creative desires of video editors and compositors working with multiple layers, custom effects, overlaid motion graphics, and color correction all without waiting.

Pinnacle Systems' CineWave for Final Cut Pro, Matrox's newly announced Axio for Adobe Premiere, and various hardware cards from Bluefish444 for both Windows and the Mac OS all add codec processing. Whereas the system CPU can decompress, edit, and recompress one stream of HD, expansion hardware might handle two or three streams. Professional editors have come to expect real-time editing of multiple layers, and they don't want to go back to rendering just because they're increasing

resolution. Adding dedicated processing support for multiple streams of DV100, or perhaps MPEG-2, offers editors a potential significant efficiency that they just can't get with software alone, at least not today.

Ultimately, professional editing is all about productivity and efficiency. And while the trend toward software-only processing is very exciting, it doesn't yet satisfy every editor's needs. DVCProHD and DV, while excellent formats, aren't every production studio's format of choice.

For about as long as digital video and non-linear editing systems have been around, there's been something of a symbiotic rivalry between hardware and software, if not hardware and software developers. Which one has the upper hand at any given time is more about perception than absolute reality. Apple's claim of "HD without any special hardware" is a tremendous achievement, but that does not mean hardware developers have nothing to add once again. ■■

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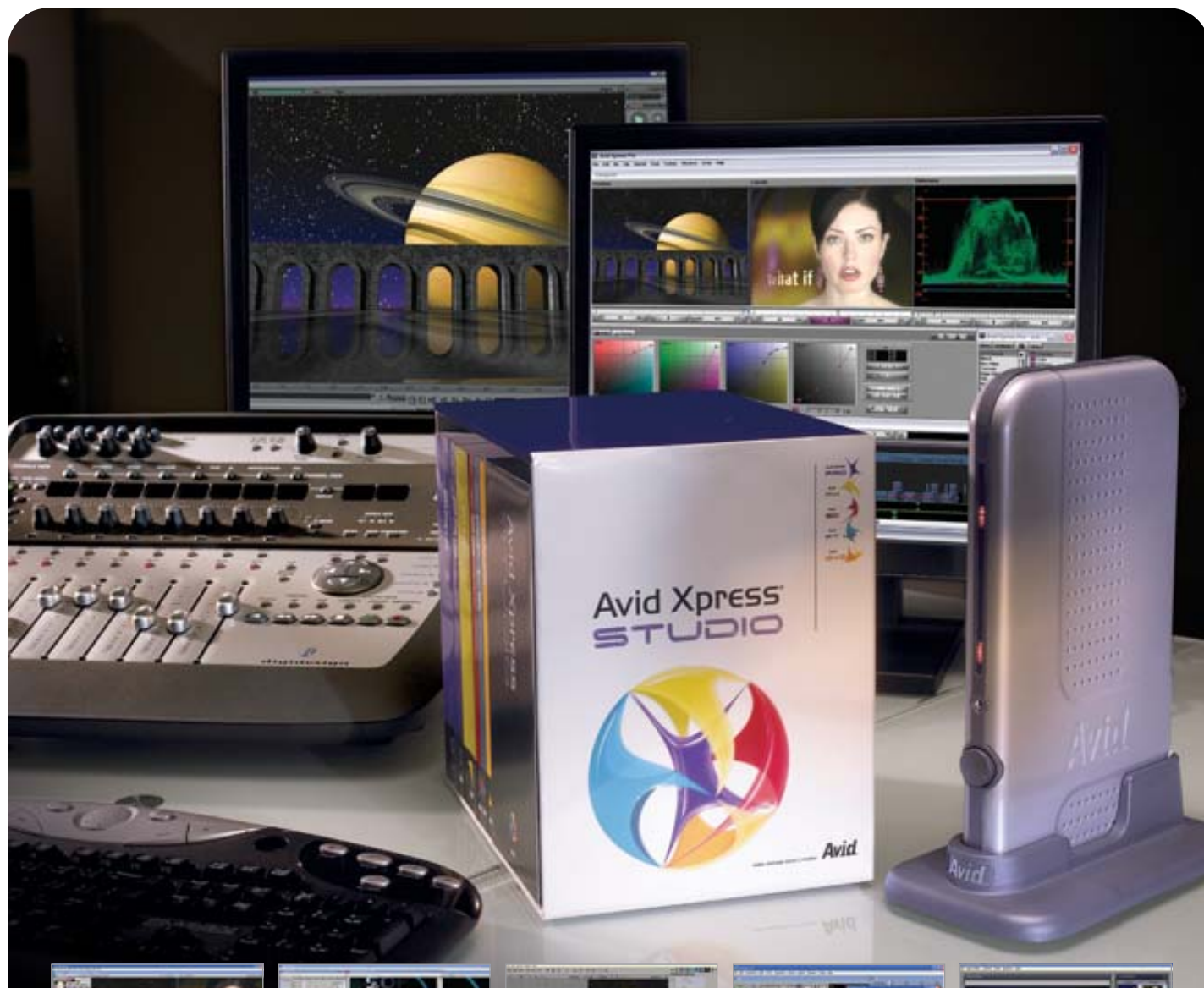
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..... Film



Pixar borrows live-action techniques for its latest animated feature, *The Incredibles*

By Barbara Robertson

This month, Disney/Pixar releases *The Incredibles*, the sixth animated feature film from the now famously dueling duo that has been rolling out box-office blockbusters since *Toy Story*, the first-ever CG feature, in 1995. Pixar's first PG film, *The Incredibles* has an edgier look and attitude than the studio's previous films.

Directed by Brad Bird of *Iron Giant* fame, *The Incredibles* features the voices of Craig T. Nelson and Holly Hunter as Bob and Helen Parr (Mr. and Mrs. Incredible), and Spencer Fox and Sarah Vowell as their children Dash and Violet—a family of suburban superheroes who have been hiding their superpowers. That's not the case at Pixar, where a crew of around 200 superheroes created the legendary studio's longest, at 107 minutes, and, they claim, largest film yet.

By comparison, while Disney/Pixar's *Monsters, Inc.* had 1400 shots, *The Incredibles* has 2253. "I set out to tell the story the best way I could, and Pixar wanted the same thing," says Bird, who transferred his talents to the studio in 2000 after making *Iron Giant* at Warner Bros. "Pixar doesn't waste money, but they're not about saving money. They want the money to be well spent. They're motivated to make a great film."

Another benchmark: *Monsters, Inc.* had 56 master lighting set-ups, while *The Incredibles* has 179—from jungle islands to suburbia. The film has smoke, fire, ice, missiles, cars, trucks, airplanes. The characters swim underwater, fly through the sky, explore caves, go to school. In addition to the Incredible family, the film features eight other main characters in various costumes. Their hair styles range from a classic comb-over to a buzz cut to hair long enough to hide behind.

For ex-superheroes Bob and Helen Parr, life in suburbia is a stretch. So, the former Mr. Incredible and Elastigirl lift their spirits as best they can. New rigging technology from Pixar made Helen's elasticity possible.

To achieve the supersized scope of this animated action-adventure film, two elements worked together. Bird's unique approach to animated filmmaking made it possible for Pixar to apply techniques more often used in live-action films than animations. And, the studio developed new methods for managing the complexities of animating multiple humans with simulated muscle deformations and dynamic clothes and hair.

Action Storyboards

Many animation directors use storyboards primarily to show dialog—to illustrate and work out the story. Separately, a layout department creates camera moves. But, Bird's storyboards for *The Incredibles* included camera moves. "It's not about dialog. It's about the movie," says John Walker, producer. "When Dash has a 100-mile-an-hour action sequence, people get the cinematic punch."

Walker traveled with Bird from *Iron Giant* to *The Incredibles*. "They sort of wrapped us in bubble wrap when we got here," he says, "and made sure the A-team surrounded us."

One member of that A-team was Rick Sayre, supervising technical director for *The Incredibles*, his fourth film at Pixar. "Brad's storyboard was more like a live-action storyboard," says Sayre. "It was 2D, but it was created in [Adobe's] After Effects—it had the timing, the pacing, the camera moves."

The crew borrowed other tricks from live-action filmmaking as well. When characters performing inside a building

did not react to action outside a window, for example, the equivalent of a first unit crew (the animators) worked on the characters' performances and a second unit worked separately on the outside scene. "It was as if the characters were on a greenscreen stage," says Sayre.

For some of those backgrounds, the crew even used 2½D matte paintings. "The second unit created 'digimattes' using 3ds max and Brazil," says Sayre, referring to Discreet's 3D software program and SplutterFish's rendering software. "It was great fun, ... liberating."

Virtually every type of natural phenomena appears in the film at least once, according to Sayre, from fire to fog. Most were created with computer graphics, but not all. One example: "When the baby is in the sink, we used a live-action water splash filmed in a kiddie pool," he says.

Lively Lighting

Even the lighters used live-action elements. Filmmakers put "cookies" or "cucaloris," which are patterns cut out of wood or another material, in front of a light source to create shadow patterns. Similarly, Pixar's lighters used cookies rather than geometry and shaders to create shadow patterns for the film. "We bought silk plants, projected light through them onto translucent fabric, and filmed the shadows," says Janet Lucroy, director of photography. "We used these shadows all over the place. For example, when Bob and Helen say good-bye at the front door, we created the tree shadow that you see on the house without having to build a tree."





Enhancements to Pixar's proprietary simulation engine allowed technical directors to sculpt the rest behavior of hair as well as change its dynamics. Simulated hair could be moved into keyframed shapes.

The lighters worked interactively with shadows created from these virtual cookies thanks to a proprietary, real-time lighting tool. "It brought us closer to live-action lighting," says Lucroy. "Before, we had to place a light, render a scene, see if the falloff was where we wanted, move the light, re-render. Now, we can compose with shadows as well as with lights."

To create soft shadows, the lighters used ambient occlusion judiciously. "We used it where we got the most bang for the buck," says Lucroy. "We can fake the shadows for a painting on the wall, but when Helen puts her hand on Bob's arm, we get a lot of payoff." For rendering, the team used Pixar's commercial RenderMan software, PRMan Version 11.5, according to Dana Batali, director of RenderMan product development. "But, because they're in-house, they also had access to features that are just coming out now in Version 12," he says.

A Rippling Silhouette

The important issues with the characters in *The Incredibles* were that there were many of them, they were humans, they had bizarre shapes, and they could move, squash, and stretch in unreal ways. The crew had to do cloth simulation, hair simulation, and muscle simulation on at least one and often multiple characters in every shot.

"We had two opposing ideas," says Bill Wise, character supervisor. "The characters were stylized cartoons that had to be believable humans. With our kind of faux realism, the closer you get to real, the creepier."

Rather than start with sculptures, modelers working in Alias's Maya created the stylized shapes from scratch in the computer. For articulation, Pixar uses its own system. "Rigging these characters was a challenge," says Wise. "There are a lot of them, and they're superheroes. So, they have to perform in wild extremes, and we needed to see muscles—to see Bob's chest expand and his biceps flex."

The crew had one advantage: All the characters, with the exception of a recalcitrant feline, were bipeds with a similar structure. Thus, the tools group developed technology that allowed rigs, built by the character team, to be reusable. "Every character referenced a template rig," says Wise. "A change to the template would propagate to all the characters." In addition to basic joint rotations, the rig handled extreme stretching—especially for

Helen's elastic arms—and squashing. "We compress, squash, distort Bob like crazy," says Wise. "In this film, when a character leaps back, we wanted a cartoony arc."

In addition, the super characters needed dynamic muscles, a new requirement for Pixar. In a typical 3D pipeline, animators perform a character by manipulating a skeleton, and then a technical crew attaches muscles to the bones and runs a muscle simulation. The bones move the muscles and the muscles drag the skin along. But, any automatic muscle movement worried Pixar's animators at first.

"The traditional techniques had everyone scared," says Sayre. "The animators did not want to give up control of the silhouette. So, John Anderson and the tools group made it possible to use physically based technology with high-level controls."

Wise's character group built reference muscles—deformer objects attached to bones at two points—and put each character through a set of training drills that exercised the degrees of freedom for each character's joints. The attached muscles moved accordingly.

"We baked the muscles and created a statistical model," says Anderson. "We ran the training set into the baked muscles and calculated the internal coefficients." Thus, even though the animators weren't manipulating muscles, when they posed a character, an algorithm could quickly evaluate the model and wrap it with skin shaped as if an underlying muscle had moved. In other words, Sayre explains, "We trained it to know that when a character looks like this, the muscles look like that. We had dynamics without run-



Director Brad Bird provided the voice for Edna, shown here with Bob. By using statistical modeling for cloth and muscles, Pixar's Studio Tools helped animators see the characters' outlines.

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••••• Film

ning dynamics.” As a result, the animators could see the silhouette.

Fast Cloth Sims

Pixar then applied the same technique to clothes. First, a technical team assembled costumes in Maya and then tested the costumes’ behavior on animated characters using Pixar’s proprietary simulation engine to move the cloth.

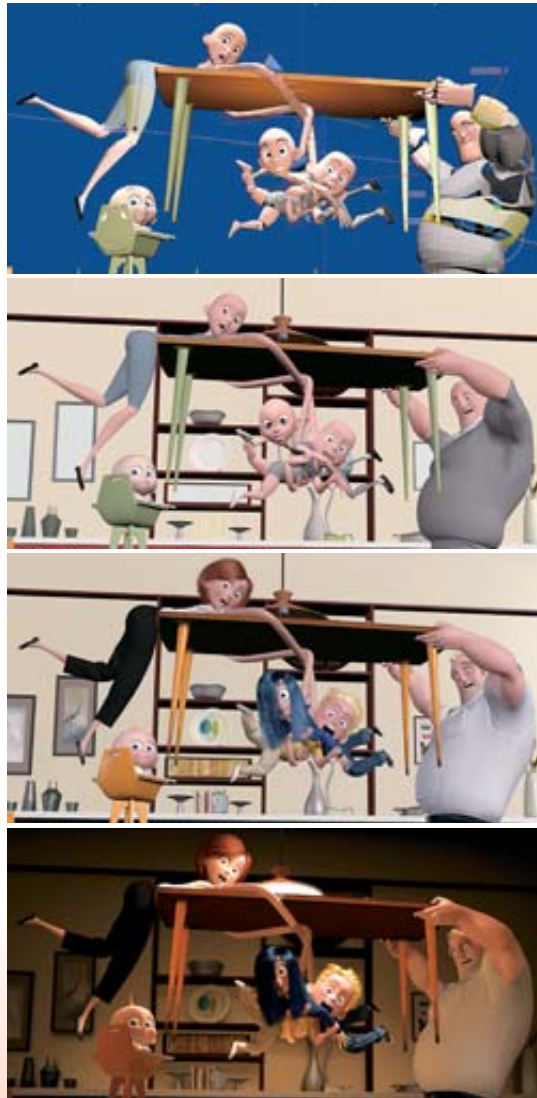
Pixar’s computer scientists David Baraff, Michael Kass, and Andy Witkin created the patented technology for Sully’s fur and Boo’s T-shirt in *Monsters, Inc.* *The Incredibles* had more characters with clothes and tougher problems. “What’s hard is when cloth moves slowly and when it collides against something small,” says Anderson, noting that in one scene Bob puts his hand through a tear in his super suit. “Collisions with fingers don’t work well because the cloth is the same resolution as the finger, and it snags,” he says.

The breakthrough in handling cloth simulation for multiple characters was in applying a statistical model. “Statistical cloth let us cross off a lot of shots,” says Anderson. “We trained the statistical model of the baked cloth using the set of training poses; the compressed memory of what the cloth looked like in those poses was implemented in an algorithm.” That meant, as with the muscle system, based on a training set of poses, Pixar got a full cloth simulation for a performance without running a simulation for that specific performance.

Hair Styles

When the technical crew for *Monsters, Inc.* first saw Boo, she had bangs that brushed her forehead. They persuaded director Pete Docter to give her ponytails instead. The crew wasn’t as lucky with *The Incredibles*—especially with Violet. “Violet is an unsure teenage girl,” says Sayre. “She hides behind her long hair.” Anderson, Witkin, Baraff, and Kass evolved the core simulation engine to handle additional collisions caused with long hair and keep the movement flowing properly.

“For Violet, Brad specifically wanted her hair to be part of her performance,” says Wise. “She puts her hair behind her ears, runs



From top to bottom: Statistical models made it possible for animators to see how a squashed and stretched character’s skin would look. Once animated, the characters are placed in their 3D environment. Hair and complete costumes are then added, and the hair and cloth simulations are run. Lastly, the scene is lit and rendered.

her hands through her hair.” These everyday human movements are among the most difficult to simulate.

“You can’t simulate the contact of every hair, so you work with clumps,” says Anderson, “but when you apply the properties to all the hair, it tends to lose coherence, so we spent a lot of time increasing the coherence of motion.”

Besides working on the core simulation engine, the engineers added features that give technical directors more control. “TDs could adjust the position and velocity of the hair, put forces on it, keyframe a pose that would attract the hair, and sculpt rest behavior into hair,” says Anderson.

Bizarre but Believable

The simulated hair was rendered with dense shadows to separate the strands, but that caused problems when, for example, it cast a shadow on a character’s face. “The characters were rendered with translucency unless they were very graphic, but translucency in the hair didn’t work,” says Lucroy. Extra fill lights fixed that problem.

The optional subsurface scattering, which gives characters’ skin a more natural look by bouncing light through layers of virtual skin, gave the primary characters translucent skin as needed. “They had to feel alive, but we couldn’t use 30-micron scans of someone’s face to

create pores and pimples,” says Sayre.

Adds Bird, “CG looks plastic without detail, but the goal was not to create lifelike humans. We had stylized, deformed people. So there was a fine line between creating creepy animated dead people and plastic characters. We hit a sweet spot by using less detail and more subsurface scattering.”

As always, Pixar has advanced the art and the technology of filmmaking—this time, with Brad Bird’s prompting, in new directions. “We had a motto,” says Sayre, who describes his job as running shotgun for Bird. “Welcome to *The Incredibles*. We’re still figuring things out.” ::

Barbara Robertson is an award-winning journalist and a contributing editor for Computer Graphics World.

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PRIDE

OF PRIME TIME

CGI roars onto network TV with
DreamWorks' Father of the Pride

By Martin McEachern

The consensus among TV executives is that the sitcom has reached a critical turning point, pushed to the brink by the surging popularity of reality TV and crime dramas, and the end of such stalwarts as *Friends* and *Frasier*. According to NBC Entertainment president Jeff Zucker, resuscitating the now-flagging genre is about risk-taking, because playing it safe with formulaic comedies no longer attracts the viewer's attention. Hoping to create the new sitcom sensation, Zucker asked DreamWorks cofounder Jeffrey Katzenberg to develop an animated prime-time series with the satirical edge and visual appeal of DreamWorks' CG films. The result is this fall's *Father of the Pride*, a 3D CG cartoon sitcom that follows the domestic lives of Siegfried and Roy's animals after the curtain falls on their Las Vegas stage act.

Considered the small-screen counterpart to the studio's feature-film *Shrek* franchise, the show is only the second CG series to air on prime-time network television, after UPN's short-lived *Game Over*, and certainly the most expensive: Insiders peg the per-episode budget at approximately \$2 million dollars, making the show one of the most costly half hours in TV history.

Targeted at adult audiences, *Father of the Pride* never exceeds the rampantly profane *South Park*, but revels in satire and social commentary that is more gleefully flippant than what's heard on *The Simpsons*. More important, the series is proof that feature-film quality animation can be produced on a weekly basis, perhaps leading to a point where 3D animation could become commonplace.

Set in the vast Secret Garden animal compound behind the Mirage hotel-casino, where the Teutonic twosome once held their stage act, the series revolves around Larry and his family of performing white lions, including wife Kate and father-in-law Sarmoti, a curmudgeon ever critical of Larry's work and parenting of teenage daughter Sierra and nine-year-old son Hunter. Along with cartoon caricatures of Siegfried and



Roy, who are portrayed as pampered, pompous loonies, the show also features a large supporting ensemble, including a mischievous gopher named Snack, a pair of muscle-bound warthog brothers, and an activist lobster.

Breaking Borders

Father of the Pride arrived in prime time amid aggressive promotion by NBC, mostly focused on the comedy and the much-vaunted CGI. But it's the breakthrough collaboration between the Glendale, California-based DreamWorks Animation and Hong Kong production house Imagi that has silently paved the way for the show's existence. Established by Richard Chuang, DreamWorks supervisor of international production, the transpacific production pipeline uses 24/7 videoconferencing to facilitate training, artwork review, and the sharing of animation files and video performances of the human actors between DreamWorks' 85 artists and 13 writers, and the 240 artists at Imagi, which produces the episodes.

The DreamWorks end of the pipeline consists of approximately 40 Hewlett-Packard Windows-based Visualize and x4000 workstations for production, and roughly 2TB of HP storage for the data transfers to and from Hong Kong. The site also dedicates an additional terabyte of local temporary HP disk space for its production workstations. Imagi, meanwhile, uses Windows-based HP workstations and a 1000-node

renderfarm, also from HP. On the software side, Alias's Maya is used for all facets of content creation, as is Eyeon Software's Digital Fusion for compositing and lighting, and Adobe's Photoshop for texturing and After Effects for motion blur.

Into the Lion's Den

Far different from a 90-minute feature film produced over a span of years, *Father of the Pride* requires a nine-month production schedule to complete a full season of 13 weekly half-hour episodes, each averaging 750 shots. The key to maintaining this strict production schedule, according to supervising director Klay Hall, is having a number of shows in production concurrently. To facilitate this, the group uses DreamWorks' automated file management system, which employs custom tools for managing the show's large number of characters and sets.

The show is beautifully rendered with a rich, organic palette, its vast environments suffused with tones that are even warmer than those of *Shrek's* storybook canvas. "We set out to create our own style in terms of looks and timing," says Hall. Nevertheless, the group relied on the studio's vast film experience to achieve the realism and the quality that audiences immediately identify with DreamWorks' CG films.

While the group chose an earthy feel for the colors of the animal sets and props, they opted for a brighter color scheme for Siegfried and Roy's art design, with harder

and straighter edges incorporated into those sets and props. Still, both designs evolved from the same approach that uses reality as a starting point without getting too cartoon-like in the process.

The imagery's soft, organic cartoon aesthetic was achieved almost entirely using Maya, bolstered by plug-ins created by DreamWorks for its recent movie *Shark Tale* (see "Reef Madness," October 2004, pg. 14). According to Chuang, the Maya/plug-in combination enabled the team to interpret the ambitious vision for the show within a limited network-based schedule and budget, both of which negated development of brand-new technology. "We use what's available and make it work," he notes.

For the first season, DreamWorks created 30 principal sets, 500 special props, and about 100 characters. In fact, a typical episode unfolds across all 30 principal sets and features two or three unique locations as well. The lion habitat is inspired by the real Secret Garden in Las Vegas, where the actual Siegfried and Roy lions reside. In *Father of the Pride*, the Secret Garden encompasses residences for the main characters and their families, and public areas ranging from the community bar to a school classroom. Since Larry and his family drive the story lines for most of the episodes, their residence is the most detailed, comprising separate, contiguous sets for the living room, the kitchen, and the children's bedrooms. Meanwhile, the assets are stored in individual files so they can be loaded into separate layers and assembled modularly.

Guided by the conceptual designs for the characters, the artists used Maya's polygon tools to surface the meshes. Because *Father of the Pride* is broadcast in HD, the artists subdivided and smoothed the polygonal models until they matched the resolution of the character models used in DreamWorks' films. "The biggest issue related to modeling was trying to effectively appraise a smooth-shaded, gray-scale model before it was surfaced with fur, since fur tends to add volume to a character," says producer Mary Sandell. This chal-



DreamWorks is drawing on its film experience to bring high-end CGI to weekly television, although it had to revise some techniques to meet the demanding network schedule.

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lenge increased exponentially, as nearly 65 percent of the characters have fur, from the long, flowing mane of the lions, to the short pelt of the gopher, to the fuzzy black-and-white coat of the pandas, to the frazzled shocks of orange hair on an orangutan.

To generate the pelts, the artists bypassed the more complex magnet-based system employed for *Shrek 2*'s fur and hair animation (see "After Effects," May 2004, pg. 14). Instead, they relied solely on Maya Fur and Maya Hair, which offer controls for such attributes as specularity, translucency, curvature, direction, clumpiness, and curliness. This forced animation

that reflect the glowering, irascibility of Sarmoti, the cheerful nonchalance of Larry and his wife, the innocent earnestness of Hunter, and the wisecracking cheekiness of Sierra.

Because of the tight production schedule, the team also used an out-of-the-box approach for other tasks, including the show's atmospheric effects (clouds, rain, fire) and terrestrial elements (sand, dust, foliage), created with Maya's effects tools. Similarly, no custom or proprietary shaders, such as *Shrek 2*'s advanced subsurface scattering skin shaders, were used. Rather, the warm organic hues of the imagery come from a palette of simple Maya shading groups, while all the rendering is done through Maya's internal renderer.



The artists used the internal tool set within Alias's Maya to model, texture, and animate *Father of the Pride*'s cast of animal characters, including (from left) an activist lobster; Donkey from *Shrek*, making a guest appearance; and the elder lion Sarmoti with young Hunter.



supervisor Raman Hui and CG supervisor Paul Wang to find innovative ways to develop, model, and texture nearly 100 furred animals during the production cycle. For example, to overcome the challenges posed by the white fur of the lions, which leaves the artists minimal color and texture for defining their forms, the modelers tailored the character designs to convey the lions' personalities, capturing, for instance, the cuteness and innocence of the kids through high foreheads and large, low, wide-set eyes, and the grumpiness of Sarmoti with heavy, furrowed brows, an elongated face, and protruding jaw. In addition, Hui and Wang created a proprietary motion-blur process that greatly enhances the definition, shading, and texture of the achromatic animals.

Animated Animals

While all the animals are anthropomorphized, they can revert to their natural quadrupedal posture, as they do in scenes with humans. Therefore, the four-legged animals have dual IK setups—a biped and a four-footed IK rig—between which the animators can toggle. Moreover, both setups are ideal for the show's animation style, which is slightly less exaggerated than that of *Shrek*.

Meanwhile, the group constructed the facial animation system from Maya's rigging tools, including blend shapes for sculpting basic facial poses and Set Driven Keys for combining them into an almost limitless range of expressions. Hui directed the designs of the facial blend shapes based on those for the principal players in *Shrek* and *Shrek 2*. Tailoring the blend shapes to the unique personality of each character, the artists sculpted shapes

Roaring to the Top

Producers attribute the quality of the program's CGI largely to animation supervisor Raman Hui, who supervised the animation on *Shrek* and *Shrek 2*. "His experience with the diversity of the characters in *Shrek* was crucial to this show, because the complexity of *Father of the Pride*'s character-driven stories demands complicated, nuanced performances in every episode," says Chuang.

DreamWorks also frequently draws on the deep pool of talent it assembled for the *Shrek* films to consult and assist on the myriad technical and artistic challenges that arise. That massive support network, maintains producer Sandell, was the springboard for a collaborative production model leveraging the vast experience, knowledge, and talent throughout DreamWorks that underlies much of the show's current success.

For its premiere episode, *Father of the Pride* roared in the ratings, drawing 12.4 million viewers to become the week's most-watched program. To a degree, the show follows the successful formula set forth by other highly rated prime-time cartoons, such as *The Simpsons* and *King of the Hill*, which have focused on the family unit, universal themes, cutting-edge social satire, and a large cast of likeable characters to connect with a mass audience. Thus far, that formula, combined with the freshness of CGI, has accomplished Zucker and Katzenberg's goal of rejuvenating the potentially lucrative sitcom genre. ::

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A collage of computer-generated faces and a magnifying glass. The collage includes a woman's face in the top left, a man's face in the top center, a man's face in the top right, a man's face in the middle left, a man's face in the middle right, and a man's face in the bottom right. A large magnifying glass with a yellow handle and frame is positioned over the center of the collage, focusing on a man's face. The background is white with light blue abstract shapes.

Three short films
from young
animators
offer fresh
ideas and
imagery

Small Surprises

By Jenny Donelan

"El Desvan," "Rock the World," and "Annie & Boo" are all computer-animated shorts from different parts of the world. And in some ways, these short CG films couldn't be more different. "El Desvan," by José Corral, is a moody tale of love, revenge, and redemption among forgotten toys. "Rock the World" from student animator Sukwon Shin is a satiric, cartoon-style music video that stars a couple of familiar-looking world leaders. And the main characters of Johannes Weiland's "Annie & Boo," one human and one not-so human, enact a gentle romantic drama on a train platform. Corral's modeling and animation features dark colors, realistic textures, and objects from years gone by. Shin's "music video" looks a little like a computer game, and also a bit like claymation. And Weiland's one-act drama has a gentle, painterly quality and at least one character verging on the realistic.

Similarities among the films include the relative youth of their creators—"Annie & Boo" and "Rock the World" were both made as student projects, and Corral began work on "El Desvan" shortly after leaving school—and their memorable characters. They have all won awards, including a place in the 2004 SIGGRAPH Electronic Theater. But most important, each of these shorts has the ability to delight—and surprise—an audience.

El Desvan

A major romantic disappointment led animator José Corral to make "El Desvan" (The

Roof), a 19-minute film about a love triangle between a jack-in-the-box and two dolls. The CG short's action takes place in an attic papered with tattered posters and littered with odds and ends, including old toys.

The film's protagonist, Sapo, is a jack-in-the-box clown with a visibly glowing heart. He is determined to find love amid the antiques and collectibles. But the object of his affection, Barbara, a statuesque beauty with a perpetual curl to her lip, is cruelly indifferent to his overtures. When the inanimate yet charming baby doll Mariquita enters the picture, emotions in the attic begin to run high.

Corral loosely based the Barbara character on vintage Barbies, but made her "much more aggressive," he says. The baby is a replica of Mariquita Pérez, a real doll that was extremely popular in Spain in the 1940s and 1950s. "The one that's in the film is exactly like the one my mother played with when she was young. She kept it for many years in a garage at my family's house in Segovia," says Corral. Sapo, the jack-in-the-box clown, however, is a product entirely of Corral's imagination.

Though Corral studied drawing in school, he created the character models for "El Desvan" directly on the computer in Alias's Maya, rather than sketching them first. He also created the other toys and objects in the attic on the computer, using pictures of antique toys found on

the Internet as references. The attic is full of detailed and contrasting textures—faded posters, Sapo's weathered wooden box with peeling paint, a shiny green metal frog. Corral created the textures by combining photographs and paintings in Adobe's Photoshop, then applied a kind of translucent version of them to objects using Maya. When necessary—for skin textures, for example—he converted the textures to solid formats.

Corral used keyframing to move the models in their different ways. Sapo lurches across the floor, dragging with great effort the box to which he is attached. Barbara moves in purposeful, quasi military style on legs jointed at the hips. To color-correct the film, and to effect the camera flyaround used in its beginning, Corral used Jaleo's digital postproduction system.

Though Corral says some people have compared his dark visual style to that of director Tim Burton, he claims not to have been inspired by any one source, but rather by a number of different works of art, and especially by comic books. "I started with Spanish comics such as *Mostadelo y Filemon* and *SuperLopéz*," he says, "then continued with American superheroes like X-Men and Spider-Man, and then went on to independent comics from Europe and the US."

Audience reaction to the quirky, disturbing, but curiously touching world of "El Desvan" has been erratic, says Corral. "Every time the film is shown at a festival, people react differently. Sometimes they

laugh at sequences that I didn't make with that [humor] in mind, and then they don't laugh at the funny parts." That doesn't bother Corral though. He's more concerned about his next project, whatever that may be, because "El Desvan," his first film, has won 16 prizes in Spain, and he's afraid that it may be a tough act to follow.

In the meantime, he's enjoying all the attention and human contact the film has garnered him. "This was a work of loneliness," he says. "After a year and a half working alone in front of the computer, the most satisfaction I've got with the film is when people tell me they've enjoyed it." He continues, "When I wrote the story I was in the middle of a deep depression, but I never wanted to make a sad story. Our character [Sapo] is depressed, but he fights to feel better and to have a partner in this place where objects are condemned to loneliness. The message of this film is that when one story finishes, another begins."

Rock the World

Powerful politicians and pompous rock stars share a dubious double bill as the satiric targets of animator Sukwon Shin's short film "Rock the World." Caricature versions of George W. Bush and Colin Powell, each resembling nothing so much as a bobble head doll on a mission, rock out in a very funny send-up that manages to poke fun at the political powers that be, rock musicians of a certain ilk, and the music video genre itself.

Shin, who is from Korea and now lives in New Jersey, says that political issues inspire him to do his best work. In the case of "Rock the World," the war in Iraq was commencing at the same time that he was developing a satiric political theme for his thesis project—hence the two main characters. Shin says he is also stimulated by the work of Korean political cartoon artist Park Jae-Dong, who



Images courtesy José Corral



A richly textured Spanish attic is the setting for a love triangle involving baby doll Mariquita (top left), jack-in-the-box Sapo (right), and grown-up doll Barbara (lower left) in José Corral's CG film "El Desvan."

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began publishing in the late 1980s. “I think he’s the first to risk making fun of the strict Korean society and government. His work is hilarious, but also makes people understand current issues in different perspectives,” says Shin. A final bit of inspiration came from hours logged watching “cheesy rock music performances” on TV. “I am a big fan of rock music,” he explains.

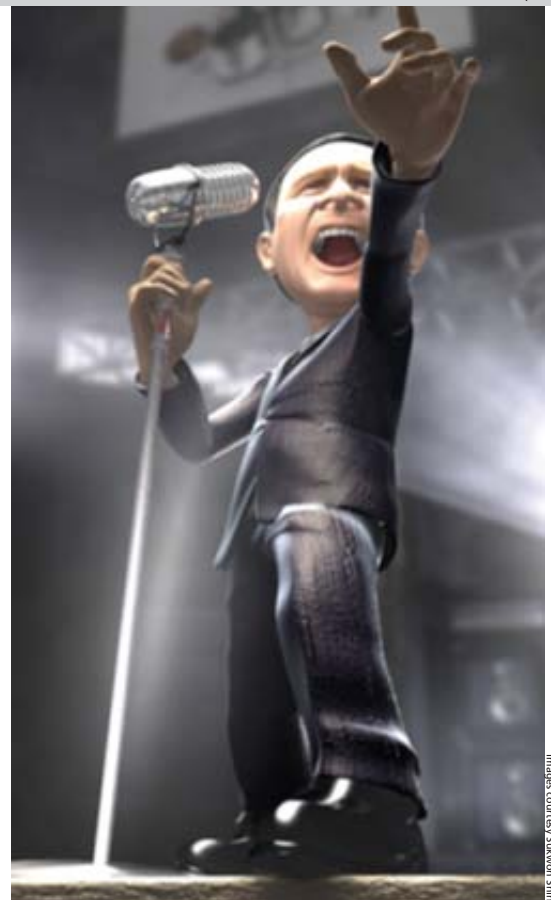
In Seoul, Shin studied sculpture at Hong-Ik University. But he felt limited by this discipline because he wanted to create narrative works of art. Eventually, he turned to CG animation and moved to the US, earning a degree in Computer Art from the School of Visual Arts in New York, where he made “Rock the World.”

His fine arts background served him well while sketching the characters for “Rock the World,” drawing Bush and Powell from the front, left, right, and various other angles until he was satisfied with their appearance. Then he set about creating their models in Alias’s Maya. He scanned textures painted in Adobe’s Photoshop onto the models, then used keyframing to animate the characters. Shin incorporated effects and other elements using Adobe’s After Effects, and edited the film in Apple’s Final Cut Pro. For audio, he employed DigiDesign’s ProTools, a software and hardware system for audio and MIDI recording.

The audio aspect of the project posed its major snag: Shin had carefully lip-synched and choreographed “Rock the World” to “Separate Ways” by Journey, but in the end was unable to obtain copyrights to the song. Instead of choosing a different tune and reanimating the piece to it—“that would have caused a lot of trouble,” says Shin—he had a song custom-composed by Splash Studios’ Tim Anderson and Peter Levin. The new tune is similar in tempo to the original, and the words are close enough for lip-synching. Where the characters sang, “Two” in the original version, for example, they now sing “True.”

In the end, the song switch proved less disheartening to Shin than the brevity of his approximately three-minute film. Rendering all the layers he’d made took longer than he’d expected, and he didn’t have the time or money to finish the piece the way he’d envisioned—“I had to stop before I reached the climax of the [original] song,” he says.

But Shin is more than happy with the outcome of Bush and Powell as rockers. “They are the last people you would expect to play rock music,” he says. “I had a strong feeling beforehand



Images courtesy Sukwon Shin

Connoisseurs of rock music videos will recognize common devices, such as the stark background and the musicians’ dramatic stances, used to comic effect in “Rock the World.”

that this would be very funny.” And he’s pleased with the facial expressions and moves of his characters, which he thinks mirror the attitudes of rock musicians who affect heroic or god-like presences.

“Animating characters,” says Shin, “is like acting. I had to figure out what it was like to be each man in the story, and I had to blend myself into the scenes. That was the biggest challenge, and the most interesting thing about my work.”

Annie & Boo

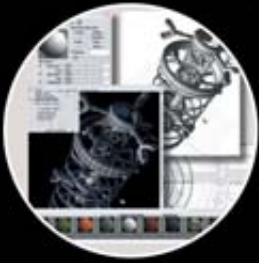
If a coincidence were a living being instead of an abstract occurrence, what would it look like? Answering this question was a major concern for director Johannes Weiland while in the planning stages for the CG short “Annie & Boo.” For this film, a coincidence would be an interactive character—that much was certain. Coincidences, according to Weiland, “are living with us.” They are hard at work creating all sorts of little occurrences that we call coincidences. “But they hide themselves very well,” he says, “and we don’t know anything about them.”

Whether these beings should be animal, human, or something in between was a puzzle for filmmaker Weiland and fellow students at Filmakademie Baden-Württemberg in Germany, where Weiland created “Annie & Boo” as his final student project.

“We had all sorts of different ideas,” says Weiland, “but nothing we could start from.” They experimented with a variety of creatures (designed to look “coincidentally” fit together, but these were all too weird-looking to convey the emotions neces-

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•••• Animation

sary for a character in a leading role, he says. After nearly a year of tinkering, they hit on the design for Boo—lantern-jawed, beetle-browed, and sporting a pair of rabbit-like ears (or antennae), but still basically humanoid.

As a coincidence whose job it is to swap suitcases and make lightbulbs go out at a train station, Boo is a bit of a failure—he keeps allowing himself to be seen by humans. Then he is smitten by Annie, a teenage girl he meets on the train platform, and the boundaries between human and coincidence really begin to break down.

The relationship between Annie and Boo—“a story about emotion, two characters, and how they start to like each other,” says Weiland—was the main inspiration behind the 15-minute film, which took two and a half years to complete. He had some help along the way: Fellow student and character designer Jakob Schuh helped create the look for Boo and Annie, and other students assisted with screenwriting and music. Besides directing the film, Weiland did the modeling and animation, using Alias’s Maya for everything from modeling to texturing, animation, lighting, and rendering. For compositing and color grading, he employed Eyeon Software’s Digital Fusion.

After modeling the characters in Maya, Weiland used keyframing to animate them. Annie, who had been much easier to design than Boo, proved harder to animate. “Annie is very realistic—simplified, not photorealistic, but real in a way—so I was a little scared about animating her in the beginning,” says Weiland. He

didn’t want to use motion capture, he explains, because it results in realistic movements that would have jarred with the semi-realistic look of her model. And he was concerned that her facial expressions accurately convey the mental processes going on within. Creating the proper facial shapes for her winsome smile, for example, entailed a lot of trial and error. “The audience has to clearly understand that she’s smiling, and what she’s thinking.”

Lighting the station was a challenge as well. Weiland planned to use the harsh, bright lights of an actual train station, but decided to use blue moonlight for the glass and metal station, and warm orange lighting for the platform. The idea was to illuminate the platform as though it were a stage, making the characters on it stand out like actors in a theater. For the background, Weiland used watercolor paintings, and, to give the scenes a “special look,” incorporated lights and shadows right into them.

Even though the film’s action takes place in a distinctly German-looking train station, in the first of two versions of “Annie & Boo,” the characters speak American-accented English. “Annie & Boo,” made in Germany by Germans, was then dubbed into German. Weiland explains that his earlier CG film, “Hessi James” (which appeared in the SIGGRAPH Electronic Theater in 2001), met with some confusion on the international circuit due to the fast-paced German spoken by its gun-slinging insect stars. Producing the dialog-heavy “Annie & Boo” in English would make it more accessible to an international audience, he says. And the

English version came first because most American and English films shown in Germany are dubbed into German, and the country is rife with vocal talents adept at synchronizing English-language mouth movements to German words. It wasn’t hard to find someone to put German words in Annie’s and Boo’s mouths, but it would have been difficult to find people in Germany to sync English dialog with German-speaking characters.

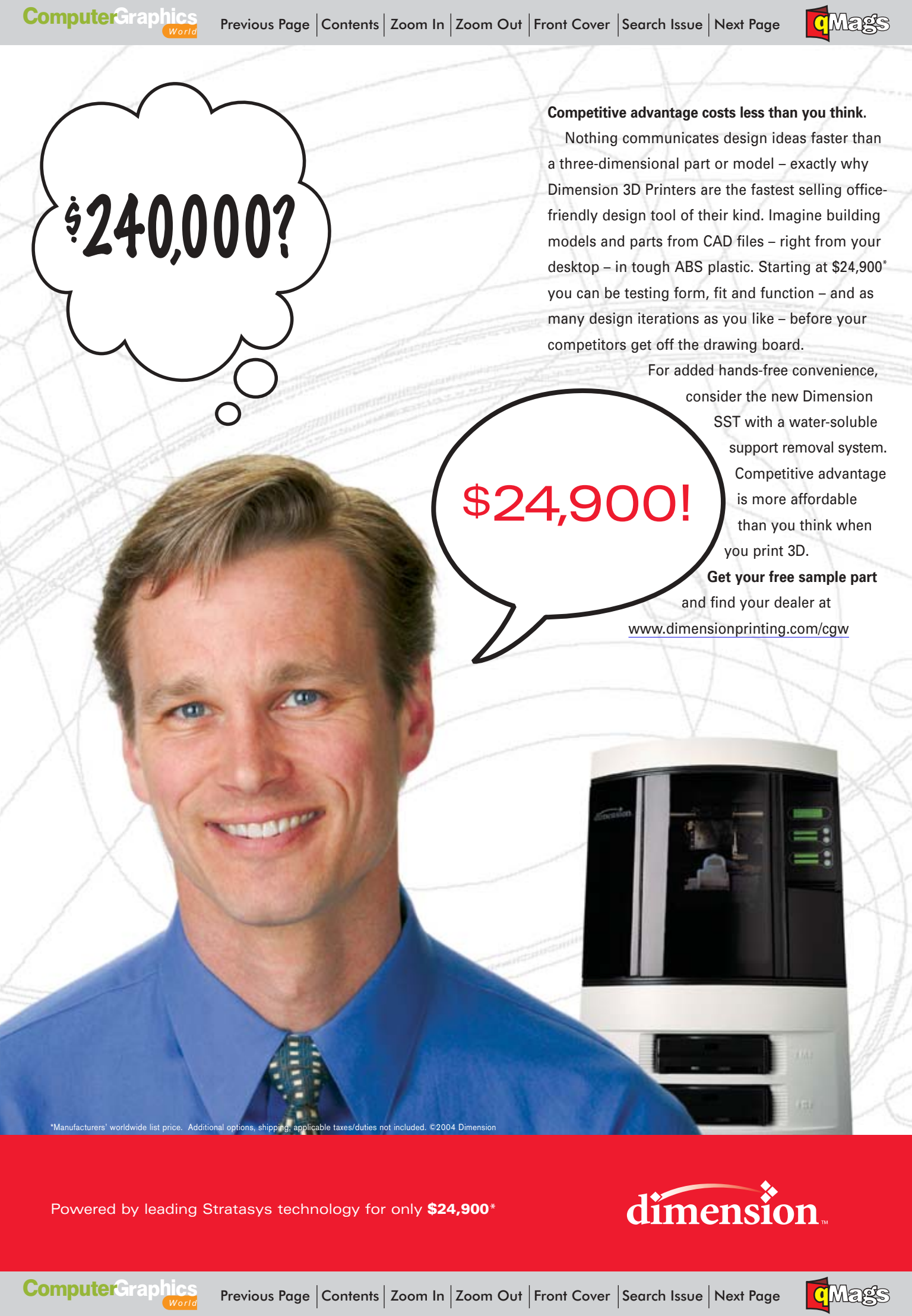
In any case, Weiland’s favorite scene doesn’t involve much talking. It happens toward the end, when Boo is standing under an umbrella in the rain, and Annie walks back to him. We can see that she’s not angry with him anymore; she’s about to give him a second chance. Boo is a little smug because a boast he made earlier has just proven true, but he’s still not sure where he stands with Annie. “There’s very little animation, except for facial animation, and yet you understand what they are thinking,” says Weiland. “I always had that emotional scene in mind, and I wanted to get the audience to be with those characters at the end.” ■■

Jenny Donelan, a contributing editor of Computer Graphics World, is a freelance writer and editor. She can be reached at jdonelan@adelphia.net.



Images courtesy Johannes Weiland

One of director Johannes Weiland’s goals for the short film “Annie & Boo” was to convey the characters’ emotions through body language and facial expressions.



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INTERACTIVE COMICS

By Lisa Taylor

Comic book-inspired games use different artistic approaches to maintain a traditional look within 3D



While many of today's action-game titles are striving to use the power of PCs or consoles to provide near-photorealistic, interactive entertainment, others are harnessing the technology to render unique, stylized imagery. Toward this end, several developers are releasing games based on popular "old-style" comic book characters, and are offering their own interpretations of the classic comic book look using state-of-the-art tools and techniques.

Perhaps the most popular style used for comic book-inspired games is 2D cel-shaded rendering, which itself has been a growing graphic trend in gaming, with such popular titles as *The Legend of Zelda: The Wind Waker*, *Auto Modellista*, and *Jet Grind Radio*. Although some developers, including Ubisoft (with *XIII*) and Radical Entertainment (with *The Hulk*), consider this style an obvious choice for the graphical representation of comic books, others such as Irrational Games (with *Free-*

dom Force vs. The Third Reich) have produced unique variations on the theme.

Even though their artistic approaches varied, each developer fought the same battle: one that entailed using sophisticated high-tech tools of today to mimic a low-tech look of yesterday. In doing so, they had to satisfy the high expectations of the current generation of game players, who require more from a title—increased interactivity, better story lines, more action, and a higher degree of problem solving—than simply a nod to nostalgia.

Freedom Force

Stepping out on a limb, Irrational Games is using the full power of 3D technology to craft its comic book-inspired PC title *Freedom Force vs. The Third Reich*—a follow-up to its 2002, highly stylized game *Freedom Force*—that's scheduled for release early next year.

The Third Reich will include a graphic style that differs somewhat from its boldly textured forerunner with the addition of Golden Age imagery from the 1930s and '40s: softer cartoon-like models and tex-

tures that have a hand-drawn appearance and include the familiar dot-color newspaper comic look from years ago. This will augment the earlier version's bold textures representing the Silver Age of the 1960s, a design that still will be reflected in some of *The Third Reich's* new characters, as well as those returning from the original *Freedom Force* title.

"Going with a 3D look [as opposed to a cel-shaded one] is a risky decision for any game that is aiming to emulate a comic book," says Jonathan Chey, project manager. "Cel shading is a technique that gives a highly stylized, 2D representation, but we didn't feel that it was appropriate for the kind of characters and environments we wanted to portray.

For the initial release, the team used a straightforward rendering solution along with textures and shapes that were bright, stylized, and clean. "This gave the game a comic feel and ensured that it didn't seem

dated from a technology standpoint,” Chey explains.

The Silver Age-style graphics that still dominate the game—from the fonts used in the menus to the bright, colorful costumes of the superheroes—instantly conjure up images of popular DC and Marvel comics: robust characters with highly detailed musculature and dynamic poses, incredibly complex settings, and the use of abstract geometric forms.

In contrast, *The Third Reich*, based on a “time travel” story line, introduces new heroes who are represented using the “dot color” style. “I looked at an old comic book from the era and studied the red, green, and blue pattern combinations,” explains concept artist Robb Waters. “I then made my own dot pattern fill using [Adobe’s] Photoshop. Each pattern is applied on multiple layers, so I can stack them up against each other to achieve the illusion of various colors.”

The pre-rendered cinematics feature stylized 2D graphics complemented by animation with slow camera pans often used in late-1960s cel-animated TV shows such as Stan Lee/Steve Ditko’s *Spider-Man* series. Conversely, the in-game graphics, while also stylized, are fully 3D and present an overhead camera perspective.

While some art assets are being carried over from the first game, most of the imagery has been either partially or completely remodeled and retextured within Discreet’s 3ds max 5. Additionally, the development team is employing NDL’s Gamebryo as a middleware rendering solution, which is enabling the group to achieve the unique style for the imagery.

A popular aspect of the current *Freedom Force* game continues to be the ability for players to create and add their own characters. “One of our priorities has been to advance the quality of the graphics for *The Third Reich* while maintaining consistency with the old characters and environments,” states Chey. “Additionally, we have ensured that our data formats are backward compatible so the user-created content developed for the first title will still be valid.”

Aside from attracting players with a

dual style of comic book imagery, *The Third Reich* also offers a unique form of gameplay that is a combination of role-playing and tactical combat. In addition, it contains atypical audio effects, including overdramatic hero voices delivering traditional cheesy lines, as well as enhanced character skinning that adds more depth to the models and dynamic lighting effects that enhance the adventure.

The Hulk

In contrast to *Freedom Force*’s full 3D approach, Radical Entertainment’s *The Hulk* uses subtle cel shading to transport the Silver Age comic book hero into the interactive 3D world of computer gaming. This choice, however, represents a compromise by art director Martin Bae, who had to ensure that the game character closely resembled its movie-star alter ego.

The early *Hulk* comics created by Jack Kirby and Stan Lee in 1962 were stylistically true Silver Age. And while the inspiration for the game’s graphics came from many areas, Bae notes that he was primarily influenced by Kirby’s work from this era. “A cel-shaded graphic style was the first thing that popped into my head when thinking about the game,” he says. “I grew up reading *The Hulk* and other Marvel comics, and what really stood out for me were the colors, rendering techniques, and dynamic composition panels.”

However, because the game was to be tied in closely with last year’s live-action film, Bae and his team were

asked to graphically align their game, which was created in Alias’s Maya and Photoshop, with the movie’s CG protagonist. For Bae, this meant that if he chose to go with cel shading, he’d have to find a way to keep it relatively subtle. So a compromise was reached. “Our cel-shading technique represents the hard-edge line used in comics,” he explains. “Nevertheless, we chose to exclude the black outlines to help blend the characters into their surroundings.”

This past summer, for the second time, yet another Marvel comic hero, Spider-Man, dominated both the big and little screens simultaneously. Yet, unlike *The Hulk*, the Activision *Spider-Man 2* game took a different tack with a far more detailed character who sports a costume similar to his movie counterpart.



Irrational Games is using a dual-style approach for its characters in the upcoming *Freedom Force vs. The Third Reich* title by including the bolder textured look from the Silver Age of comics (above) and the softer, “dot color” look from the Golden Age (left).

..... Gaming

XIII

Like Radical Entertainment, Ubisoft chose a cel-shaded look for its *XIII* game, but opted to take it further toward its comic book roots by employing full cel shading with a modern twist.

While perhaps little known in North America, *XIII* is a popular French comic book created in the 1980s by Europe's renowned comic book artists/writers Jean Van Hamme and William Vance. So when game giant Ubisoft decided to create a first-person shooter based on the comic, it was only fitting that the job go to its French division.

Like *The Hulk*, *XIII* uses cel shading to visually tie the game to the original comic book. And while art director Nathalie Moschetti and graphic project manager Nathalie Provost looked to the original artwork for inspiration, they were also influenced by classic works of architecture, old movies, and other comic strips. "People who are familiar with the comic will recognize it immediately, but we've modernized it with a more sophisticated look," says Provost. "What gives *XIII* such a distinct style was the fact that neither the art director nor myself is a big game player; therefore, we looked for our graphic reference points outside the world of games."

Provost had gained previous experience with cartoon-style rendering of game graphics while in Japan working on a Manga game, based on Japanese anime. "The game never went beyond the design stage, but the experience got me hooked on a cartoon-effect plug-in we developed," she says. "I was sure we'd find a way of using it, not as an end in itself, but as a tool to push the mood of a game. And a game with a cartoon-strip license seemed like the perfect opportunity for trying it."

The cel-shader plug-in, used to render all *XIII*'s 3ds max characters and many of the game's weapons and objects, gives the 3D models a flat tint that makes them look 2D. A black line permanently surrounds the objects, while on the surfaces, the lighting effects create clearly defined shadows.

Provost's team originally wanted to treat all the geometry with this plug-in, but the process resulted in extremely dense 3D models. "With the plug-in, you couldn't cheat by using falsely textured surfaces," Provost explains. For this reason, she opted for a cel-shaded look, created by applying Photoshop textures with black outlines to surfaces and polygonal objects, making them appear as though a black silhouette surrounded them.

Beyond its intriguing characters, *XIII* also features text-based visual "sound effects" such as BANG! and BAM!—a well-loved comic book technique—as well as 3D visual effects created within Epic's Unreal Engine, which was modified for the



Ubisoft's French division used a cartoon-effect plug-in, developed in-house, to create the unique shaded look in its *XIII* game.

game. Provost refers to the result of mixing cel shading and 3D effects as the game's "hybrid" style. "*XIII* has a mix of 'true' and 'false' that's always kept in balance," she says. "The characters are cartoon-like but have human proportions. The decors look sketched, but the effects are realistic. This remains consistent in the game. Despite the technical constraints, we managed to do something original using simple techniques."

XIII has received numerous game awards, and Provost and Moschetti themselves received the Imagina Best Graphic Designer award for their work on the project.

Forever the Hero

Comic books—once a predominant form of entertainment among youngsters—began to be displaced in that demographic beginning in the 1980s by interactive media forms. But cyber heroes such as Mario and Link from the gaming world have proven no match for the legendary comic book characters of yesterday. As a result, the tie-in between games and comic books continues to proliferate.

In an unusual twist, an original computer game with a comic book style actually sparked a soon-to-be-released comic book series that's based on the game, rather than vice versa. Inspired by superhero comic characters, *City of Heroes*, a massively multiplayer online role-playing game released in April, features its own unique 3D, brightly colored, graphical interpretation of comic book imagery.

Proof of their popularity is the fact that comic book heroes have been front and center in a number of Hollywood blockbusters recently, with several more comic book-based films in development. While these movies often feature live-action stars, CG is playing a critical role in enhancing their super powers, creating fictional cities, and delivering effects-packed action scenes. And while the film versions are taking the characters away from their native art forms, stylized games are putting the original POW! back in. ■■

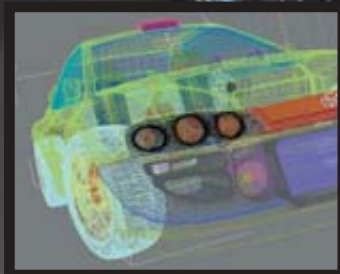
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City of Heroes, an original cartoon-rendered MMORPG, has spawned a comic book series that's based on the game.

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Frame Freeze

Artists use creative
compositing as the
framework for
innovative effects

By Karen Moltenbrey



Picture this: In a television commercial for Hewlett-Packard's digital photography line, actors seemingly re-arrange segments of the live action by reaching out and adding or removing a "picture" from the scene.

In the spot, titled "Picture Book," the action is momentarily frozen, mimicking a camera snapshot. Then, actors within the scene physically interact with that "photo," which is actually a frame of video that was cut, or roto-scoped, from the scene when the video was frozen. Next, the frame is composited back into the subsequent action as a photograph.

This plays out in a number of ways. For instance, one segment contains several people who, standing side by side, outline their head and face by holding up a white, hollow frame. The action pauses for less than a second, after which each actor exchanges "looks" with the person next to him or her by first handing off the initial picture frame (now with that actor's portrait inside) to someone else and then "re-

framing" his or her face with the white-bordered portrait the actor had just received from another. In a different scene, a woman sitting on a park bench reaches up and grabs a "picture" containing the image of a girl who's bouncing on a trampoline in the background. In yet another sequence, a person at a masquerade party "unmasks" guests by removing—and, in some instances, adding—a piece of video containing the party-goer's made-up face.

The face that's behind this creative commercial is that of Francois Vogel, an experimental film director who has extensive experience with digital compositing techniques—which are key to the video effects in the commercial. "Using those [compositing] skills, Vogel did extensive planning and testing before pitching the concept to HP's ad agency, to ensure that it could be done," says Chris Jones, creative director at Zoic Studios, which executed the effects. "As a result, we had a good idea of what he was thinking, and that's rare when you are planning visual effects."

Director and former compositor Francois Vogel followed up last year's acclaimed HP "You" television commercial with "Picture Book," an innovative spot in which the live actors interact with still video images acquired from each scene.





While the effects remained constant in the various scenarios, each one required a different treatment on set and in postproduction, specifically with respect to tracking and compositing. In fact, some segments implement a still video image, while others use several seconds of a video clip.

For instance, in the change-of-identity scene, people are handling what appear to be prints with white borders. But in reality, they are passing around white foam-core frames so that each person would have a physical object to interact with. Later, in postproduction, the artists used Discreet's Combustion to track the physical white frame. Also using Combustion, they roto-scoped a single frame of video from the live action, and with Discreet's Flame, composited that still image inside each white frame.

For the trampoline sequence, the girl was filmed separately against greenscreen, allowing the artists to change her positioning in space to more accurately time her actions with those of the woman, seated on a bench in the foreground. Next, the crew filmed the woman as she reached into the air while pretending to snatch photos and then place them on the bench.

For a tracking reference, the group placed greenscreen paper, which was cut to the proper size, on the bench where the woman would pretend to lay the photos. Then, as they did in the other scenes, the artists tracked the object—in this instance, the paper—using Combustion, roto-scoped

The 60-second commercial incorporates the same underlying postproduction technology—rotoscoping and compositing, using Discreet's Combustion and Flame, respectively—to create a range of visually striking effects.

the girl from the greenscreen shot, and composited her into the final scene using Flame.

According to Jones, this greenscreen method not only gave the artists an object to track, but also allowed them to obtain all the practical reflections from the scene, which they later augmented to give the video snapshot a glossy, picture-like look. "We tried to replicate the original scene in the composite,



For this trampoline scene, artists used greenscreen paper to aid in the subsequent tracking and lighting.

but sometimes we had to depart from reality to make the 'photo' look slightly more creative," he explains.

All nine "picture perfect" scenes in the 60-second commercial contain in-camera effects only, with the exception of the masquerade party. For that, the group used 3D paper created in Alias's Maya, instead of the practical greenscreen paper. "We wanted interesting reflections and a little movement, so we projection-mapped the photograph onto simple geometry and then utilized the more traditional lighting methods

available to us within the 3D environment to create a sheen and glossy feel to the prints," explains Jones. "Approaching this sequence from a 3D perspective gave us a lot more flexibility and control than would have been available using Flame's 3D lighting program."

Because the spot would be distributed internationally for broadcast and theatrical release, all the work was completed in HD 25p PAL format, which is rare for television commercials because of its high cost and unforgiving nature. In fact, the most difficult aspect of this project for Zoic was working in that high-end format and handling the large volume of shots. Also, the technical work—tracking, roto-scoping, and finessing—had to be precise in order for the effects to work properly.

Moreover, the artists had to make sure that when they used still images rather than video clips, the stills looked like photos and not the frozen frames of video that they indeed were. So to avoid the "frozen video" pitfall, the artists used color correction, playing with the contrast and saturation in the still, while for some of the more complex shots like those in the masquerade scene, they used the 3D lighting capabilities in Flame and Combustion to tweak the image.

"The beauty of the spot is its simplicity," Jones says, "and yet it looks impressive." ■■

Karen Moltenbrey is a senior technical editor at Computer Graphics World.

Portfolio

Elemental Art, Part 2



From top to bottom:

Yesterday, the Lost Time (Still Life) To achieve a "classical" look for this image, Xu Zhelong of Magic Stone Images in China focused on the textures, which were generated in Adobe Photoshop and 3ds max's Vertex Paint combined with the DarkTree procedural shader tool. Using the Brazil/rs rendering system, he was able to achieve the look he desired, which mimics that of an oil painting. Lighting plays a major role in the scene as well. By setting the sky light to dark green, he achieves a dark shading contrast with the brightness of the lights.

Born in the Ruthless Days (Creature in Repose) This image, by Wen Bo Cao of China, uses a stylized realistic approach to creating the tiger and its environment, both of which were created mainly in 3ds max. An especially compelling feature of the piece is the natural look of the animal's fur.

Digital artists strived for years to have their work recognized as "real" art. And yet, 3D software and rendering hardware made it difficult for all but the most technically savvy artists to realize their true potential using the medium. "In the past year, however, we have crossed a boundary where software and hardware are no longer huge hurdles for artists to overcome. This is nowhere more evident than in the realistic lighting and rendering solutions now available," says Mark Snoswell, art director and co-editor of *Elemental*, a coffee-table book featuring a wide range of CG fine art.

With a growing palette of sophisticated, user-friendly tools now at their disposal, an ever-increasing number of CG artists are creating works of art as diverse and visually stimulating as those crafted by traditional artists. *Elemental* embraces



this notion by showcasing a broad range of styles that run the gamut from cartoon-like to photoreal. Though all are visually and technically impressive, some of the more intriguing pieces are those that project a stylized realism—a glimpse of reality that is altered by the artist's own viewpoint.

In last month's Portfolio, we showcased a selection of stylized-realistic Architecture and Environment images from *Elemental*. This month, we chose a sampling of works within this genre that fall under the Beauty, Still Life, Character in Repose, and Creature in Repose headings.

Elemental, a joint venture between Ballistic Publishing and Discreet, is available at www.ballisticpublishing.com or www.discreet.com. —Karen Moltenbrey

Clockwise from top left:

Mamegal (Beauty) Koji Yamagami of Beans Magic in Japan achieves near-photorealism through the use of 3ds max, Character Studio, Brazil, Shag:hair, and BonesPro to create this compelling model, including the reflection in the eyes and the slight but natural skin imperfections.

My father (Character in Repose) Using 3ds max, Photoshop, and Mental Ray, Marco Lazzarini of Italy created this soulful stylized character.

Fruits (Still Life) Kornel Ravadits of Hungary was challenged by the compilation of the shaders for this image, since each piece of fruit had a different shader property, forcing him to experiment with reflections.

Eun (Beauty) An actual person was the inspiration for this portrait by Woo-Young Park of the Republic of Korea. He paid particular attention to achieving natural reflections in the eyes.

Compositing Software

By Courtney E. Howard, Senior Technical Editor

During the recent IBC, SIGGRAPH, and NAB exhibitions, industry-leading vendors unveiled new releases and enhanced versions of professional video editing, effects, and compositing software solutions. Although a number of compositing systems that combine hardware and software tools exist, this segment focuses on today's software-only compositors. For additional information about the offerings described, visit the corresponding manufacturer's Web site.



Pinnacle Systems

Pinnacle Systems recently previewed an upgraded version of its Liquid Edition video editing software. Liquid Edition 6 enables real-time, multi-format editing, compositing, effects, audio, and DVD authoring from a single, redesigned Windows-based user interface. Version 6 gains not only real-time, native HDV editing functionality, but also SmartRT and SmartEdit technology, a new audio effects engine with an audio mixer, and compatibility with Pinnacle Studio. Users benefit from expanded Multicam support of up to nine camera angles, new Track Matte and Mosaic real-time effects, and improved control via parameter-based Bezier keyframe compositing. The Pro edition includes a professional analog and digital I/O breakout box and USB 2.0 technology. Liquid Edition 6 and Liquid Edition Pro are priced at \$499 and \$999, respectively.

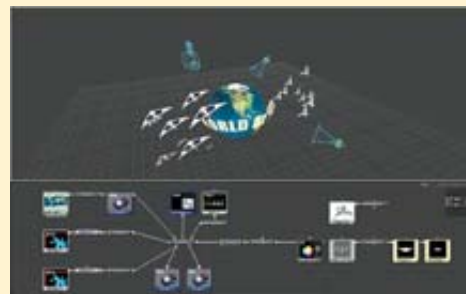
Pinnacle Systems; www.pinnaclesys.com

Eyeon Software

Eyeon Software has unveiled Fusion 5, the latest version and tenth major incarnation of its desktop compositing software. Fusion's core architecture has been updated with a full 3D environment, OpenGL acceleration, B splines, a new mask node feature, and support for editing flows in ASCII.

The company also offers DFX+, an 8-bit expandable version of Fusion. Fusion Version 5 is scheduled to begin shipping at the end of this year for \$4995. Eyeon Software customers purchasing Digital Fusion 4 between August 10 and the release of Fusion 5 are able to upgrade for free.

Eyeon Software; www.eyeonline.com



Adobe Systems

Adobe Systems has upgraded its After Effects motion graphics and visual effects software, part of the new Adobe Video Collection 2.5. Offering tighter integration with Adobe's other video programs, After Effects 6.5 has been enhanced with new Animation Presets, including more than 250 text animations and over 60 new effects. An advanced clone tool with five customizable presets, three grain-management utilities, support for OpenGL and scripting, one-click controls, and color correction via Color Finesse from Synthetic Aperture round out the updated offering. The company's motion graphics and visual effects software for Mac OS X and Windows 2000 and XP, After Effects 6.5 is offered in Standard and Professional versions priced at \$699 and \$999, respectively.

Adobe Systems; www.adobe.com



Apple

Apple has released Shake 3.5, an updated version of its visual effects and compositing solution for film, HD, and commercials. Newly added shape-based morphing and warping utilities take advantage of industry-standard spline tools, enabling advanced compositing and "shape-shifting" special effects. Upgrades include support for 16-bit RGB and 10-bit YUV QuickTime formats and an improved Rendevous-enabled Shake Qmaster network render manager. Now shipping, Shake 3.5 for Mac OS X is priced at \$2999, whereas Linux, and Irix versions cost \$4999 each.

Apple; www.apple.com



Avid Technology

Avid Technology has announced the availability of Avid Studio Tools, a suite of content-creation programs. Included in Studio Tools is Avid FX software, based on the Boris Red compositing and titling system. In addition to offering advanced compositing features, Avid FX boasts more than 1500 customizable title, effects, and transition templates and more than 110 filters, including Wire Removal, Light Zoom, Light Warp, Z Blur, Grain Match, and Motion Blur. Additional features include integrated dynamic compositing, true 3D DVE, motion tracking, and more. An AVX plug-in for the Windows platform, Avid FX is available separately or as part of Avid Xpress Studio and Avid Studio Tools.

Avid Technology; www.avid.com



Quantel

QEffects compositing software is designed to complement the company's range of DI and HD systems, including its iQ DI system. Whereas the iQ is involved with assembling, editing, color grading, and versioning full-resolution digital film material, QEffects brings non-client attended tasks onto the desktop. When used with the Quantel eQ editing, effects, grading, and mastering system, QEffects saves time by delegating time-consuming tasks to an assistant. QEffects has the same interface and compositing toolset as the iQ and eQ. Version 2 boasts a new multi-view compositor, and the compositing environment is 3D Aware, fully understanding 3D space.

Quantel; www.quantel.com



Discreet

Discreet's product portfolio encompasses four visual effects design and compositing tools: Combustion 3 desktop compositing and motion graphics software, and the Inferno 6, Flame 9, and Flint 9 range of real-time visual effects systems. Targeted at digital artists designing for video, film, broadcast, DVD, and the Web, each provides a full 3D compositing environment, creative tools, integrated paint, advanced animation capabilities, and an integrated, design environment for interactive, client-supervised sessions.

Discreet; www.discreet.com

Ultimatte

Ultimatte offers AdvantEdge 1.5, the latest version of its professional-level blue-screen matte extraction plug-in. For use with Adobe, Apple, Discreet, and other popular video tools, AdvantEdge enables the automatic and accurate compositing of such elements as fine hair detail, water, shadows, smoke, glass, reflections, and blurred edges. Priced at \$1495, Version 1.5 offers faster setup and render times, user-defined system preferences, a DV Video Correction filter, and more.

Ultimatte; www.ultimatte.com



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MOBILE WORKSTATION

HP Compaq nw8000

This mobile workstation enables the creation of professional-level graphics on the road

By George Maestri

For a long time, having a powerful graphics workstation and a portable workstation were two mutually exclusive goals. Workstations tend to be big, bulky, and power hungry, whereas laptops are portable, compact power misers. HP tries to bridge this gap with the HP Compaq nw8000 mobile workstation, a fairly powerful system that provides professional-level OpenGL graphics by way of an ATI FireGL chip.

A portable workstation such as the nw8000 lends itself to all sorts of terrific uses. Visual effects directors can use the machine for on-set previews, editors can cut footage in the field as it is shot, and architects can bring their CAD programs with them to the job site. I'm sure this machine will find plenty of demand in these and other fields requiring a powerful, portable workstation.

The nw8000 is on the large side for a laptop, weighing in at 6.5 pounds. Well constructed, it should stand up to a lot of abuse. Ergonomically, it's thicker in the front than most laptops, making it a little difficult for users to type. The machine offers two pointing devices: a touchpad below the keyboard and a trackpoint in the keyboard. While it is a nice feature for some, I personally never use trackpoint pointers; I would guess this is the case with a majority of graphics professionals. I would have preferred a slightly larger touchpad with a side scroll bar, which many newer laptops now sport.

The nw8000 is richly configured when it

comes to input/output ports.

It has built-in Ethernet, a modem, and an 802.11g card for networking. Connectivity also can be had via standard serial and parallel ports, Fire-

Wire and USB slots, and a Bluetooth dongle that ships with the machine. As concerns storage, the workstation I tested sported a 60GB 7200 RPM hard drive, a CD-RW/DVD drive, and a whopping 1GB of system RAM.

The system's processor is a power-saving Pentium M, which is clocked at 1.8GHz. It may sound slow, but the Pentium M has a different architecture than the Pentium 4, enabling it to achieve much better performance at lower clock speeds. The Dhrystone integer test gave a score of 7769MIPS, while the Whetstone floating-point test offered up a score of 2763MFLOPS. Its integer score is great for a single-processor workstation, and also when compared to that of a 2.8GHz Pentium 4. The floating-point score came up a little short compared to a current Pentium 4 desktop machine. This figure is certainly one of the trade-offs for a mobile machine; manufacturers are forced to balance such characteristics as raw speed against space- and power-consumption issues.

As for the graphics quality, the nw8000 offers a screen that is large for a laptop—measuring in at 9 by 12 inches—and had very good color reproduction. I liked the fact that it runs at a default resolution of 1600x1200, which supplied me high image quality and plenty of room to work.

A majority of this workstation's power is contributed by the graphics chip. The nw8000 employs an ATI FireGL X2-256t chipset to achieve truly professional OpenGL performance in a small package. ATI is reportedly the first vendor to incorporate its high-end chips into a laptop. A



The HP Compaq nw8000 combines powerful components, not the least of which is ATI's FireGL chip, to offer high-end graphics performance.

Viewperf 7.1 test revealed a 3ds max score of 13.6, Pro/E score of 25.1, and UGS score of 20.8. These numbers were much lower than the similar ATI FireGL card I reviewed in the HP xw8200 (see August 2004, pg. 54). Again, the speed hit is part of a trade-off between performance and power and space consumption.

Overall, the speed of the nw8000 was perfectly acceptable for most content creation tasks. While on the road for a business trip, I used it to animate a couple of scenes in Discreet's 3ds max. I experienced absolutely no problems. I also tested it with Adobe's Photoshop, After Effects, and Premiere Pro. All worked great, and editing DV footage was a breeze. Even uncompressed video worked well, thanks to the fast 7200 RPM hard drive.

With all this power under the hood, I expected it to consume power faster than Phoenix in a heat wave. Surprisingly, battery life is excellent. It ships with one battery, but another can be added for nearly six hours of unplugged operation. I found myself leaving it on while I did other things, which I would never do with my own laptop. The nw8000 is a fast and solid performer. Having the ability to take professional-level graphics and power on the road is a huge benefit, and I'm sure this machine will find a solid niche in the world of digital content creation, CAD, and scientific visualization. ■■

George Maestri is president of Rubberbug, a Los Angeles-based animation studio specializing in character animation.

HP Compaq nw8000**stats**

Price: Starts at \$2025, as configured \$3599

Minimum System Requirements:
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3D MOTION CONTROLLER

SpaceBall 5000

3Dconnexion's 3D motion controller offers extensive freedom of movement

By Courtney E. Howard

I'll admit that I am seldom cognizant of my mouse, or the extent to which I implement it in my daily work flow—that is, until I feel the all-too-common discomfort associated with its use. The same is true of other input devices at my disposal. And yet, these often-overlooked computer peripherals are a necessary and integral part of my work on a near-constant basis. Several months ago, when I opted to add the SpaceBall 5000 motion controller to my work space, I became aware of the impact of such devices on my productivity. Then, while attending SIGGRAPH 2004, I couldn't help but notice the very same SpaceBall in the hands of creatives at a variety of exhibitors' booths.

The SpaceBall 5000 is the brainchild of 3Dconnexion, part of Logitech, a company reputed as knowing a thing or two about constructing quality ergonomic devices. It is designed for two-handed use, in tandem with, not as a replacement for, a traditional mouse. 3Dconnexion offers the SpaceBall 5000 in two versions: Serial and USB. I employed the SpaceBall 5000 USB, which I simply plugged into my Windows 2000-based system.

The 3D controller was accompanied by a CD-ROM, which I used to install the company's 3DxWare driver for my operating system. Installation was simple, thanks to the auto-run CD, and required

roughly five minutes. From the CD, I also gleaned plug-ins required to use the SpaceBall with Discreet's 3ds max, Adobe's Acrobat and Photoshop, and the Microsoft Office software suite. A separate CD-ROM offered the plug-in required for Alias's Maya. Also requiring installation, the demo and training applications and a users' manual proved useful in getting me acquainted and up and running with the controller.

In all, the SpaceBall 5000 supports more than 100 popular software programs. In addition to the aforementioned, the list includes Maxon's BodyPaint 3D and Cinema 4D, Softimage|XSI, Kaydara (now Alias) MotionBuilder Pro, and page-layout utilities Adobe InDesign and QuarkXPress. The full application list, from which I noticed NewTek's LightWave is missing, is provided on the company's Web site.

Because the device employs a high-precision optical controller, it responds to small movements. Just light pressure, and no wrist or arm movements, is required. And I can predict that maintenance will be minimal, thanks in part to the unit's drift- and calibration-free sensor mechanism. The SpaceBall is sturdy, and wear and tear should be minute, considering its contactless architecture. Despite using the device

for several hours a day over a period of several months, I did not experience either physical discomfort or frustration—praise that I cannot bestow upon any mouse I've ever used. Additionally, I noticed no degradation in the quality of the controller or its functionality.



Pairing the SpaceBall 5000 with industry-leading software tools, including 3ds max, Maya, and XSI, I trimmed time off my overall work flow.

When working with 3D software, I used the controller to pan, zoom, rotate, and spin models, navigate scenes, and edit camera data. In 2D applications, especially Photoshop, the SpaceBall proved effective in scrolling, as well as panning and zooming. With my left hand on the SpaceBall, I was able to use the mouse in my right hand for editing or selecting objects, settings, or programs.

Given my lack of coordination, the new two-handed work style took some getting used to; yet, this is the only learning curve I experienced with the SpaceBall 5000. After an adjustment period of roughly two weeks, I found that I more than made up for the acclimation period by meeting my deadlines sooner. If you're already accustomed to two-handed operation, implementation of the SpaceBall is unlikely to put a crimp in either your style or your production schedule.

My work flow was further streamlined by the device's 12 programmable buttons. With the help of the users' guide, I was able to assign commonly used functions, keyboard modifiers, or macros to each. I found a dozen buttons to be sufficient, and experienced time-savings as a result of their use. I recommend designers and animators consider adopting the SpaceBall 5000, and 3Dconnexion's 30-day trial provides a risk-free opportunity to do so. ■■

Courtney E. Howard is a senior technical editor at Computer Graphics World.

SpaceBall 5000

Price: \$499

Minimum System Requirements: Intel Pentium 4/III/II/Celeron or AMD-K6/ Athlon processor-based system, and 20MB of free disk space. Serial version: Windows NT/2000/XP, Linux, or Unix for SGI, HP, Sun, and IBM; USB version: USB 1.1 or greater, Mac OS X, Linux, or Windows 2000/XP.

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www.3dconnexion.com

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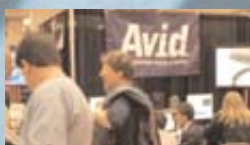
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SOFTWARE

3D IMAGING

2D to 3D

Mac HumanEyes Technologies has unveiled HumanEyes Capture3D, a 3D software solution designed for use with today's digital cameras. Now available, HumanEyes Capture3D enables users to generate realistic 3D images using data captured with virtually any digital camera. The software does not impose limits on picture width; in fact, it can be used to create 360-degree panoramas. HumanEyes Capture3D also can assemble 2D and 3D photography into a single, seamless image. Additional features include guided optimization of 3D scenes, automatic convergence point control and parallax (depth) control, and support for TIFF, JPEG, and AVI file formats. A fully functional, 30-day trial version is available for download from the company's Web site.

HumanEyes Technologies;
www.humaneyes.com

VIDEO

Editing Update

Win Pinnacle Systems has upgraded its Liquid Edition video editing software to Version 6. The upgrade provides users the ability to edit multiple streams of native HD content with real-time effects. Its SmartEdit feature enables the combination of multiple formats and standards in the same timeline. Users have the option of editing in native HDV or DVD formats, as a result of SmartEdit's support for various codecs, including DV25, MPEG-2 I-frame and IBP, and uncompressed. The new edition also features a redesigned Microsoft Windows-based user interface, compatibility with Pinnacle Studio, and a Steinberg-inspired audio engine. At the same time, Version 6 of Pinnacle Liquid Edition Pro gains a profession-

al analog and digital I/O breakout box that takes advantage of USB 2.0.

Pinnacle Systems; www.pinnaclesys.com

RENDERING

Made to Manage

Win Shoran Software has released its RenderPal 2004 Server Version 1.3, the updated



edition of its professional render management system for such renderers as Alias's Maya, Mental Images' Mental Ray, SoftimageXSI, and NewTek's LightWave. Version 1.3 now enables users to monitor and control jobs, as well as render clients, via the RenderPal 2004 Job Submitter. Abolishing the need to add clients manually, RenderPal 2004 Server can automatically add clients by using UDP heartbeats sent by the RenderPal 2004 Client. In addition to support for 10 clients and five net jobs, RenderPal 2004 Server offers the ability to import render settings from a Maya scene file (command-line support included).

Shoran Software; www.renderpal.com

HARDWARE

DISPLAYS

Slim LCDs

NEC-Mitsubishi Electronics Display of America has updated and expanded its AccuSync family of flat-panel displays. The company's LCD



monitor series sports a slim cabinet design and two new 20-inch models, the ASLCD200VX and ASLCD200VX-BK. The new displays boast NEC-Mitsubishi's On Screen Manager, which enables users to adjust display settings either via up-front buttons or, with the help of the company's NaViSet software, via a mouse and keyboard. The AccuSync line includes 15-, 17-, 19-, and 20-inch base and multimedia versions in a choice of a black or white cabinet.

NEC-Mitsubishi; www.necmitsubishi.com

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Macworld Conference and Expo, held in San Francisco. Contact www.macworldexpo.com.

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Video Forum 2005, held in London. Contact www.videoforum.co.uk.



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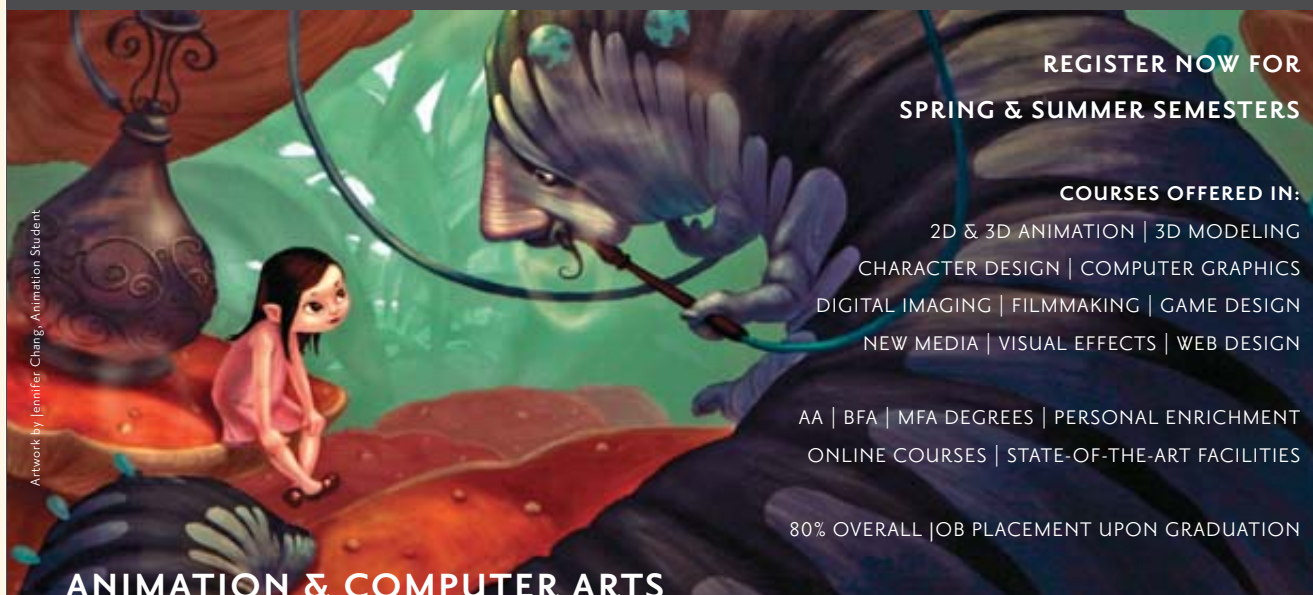
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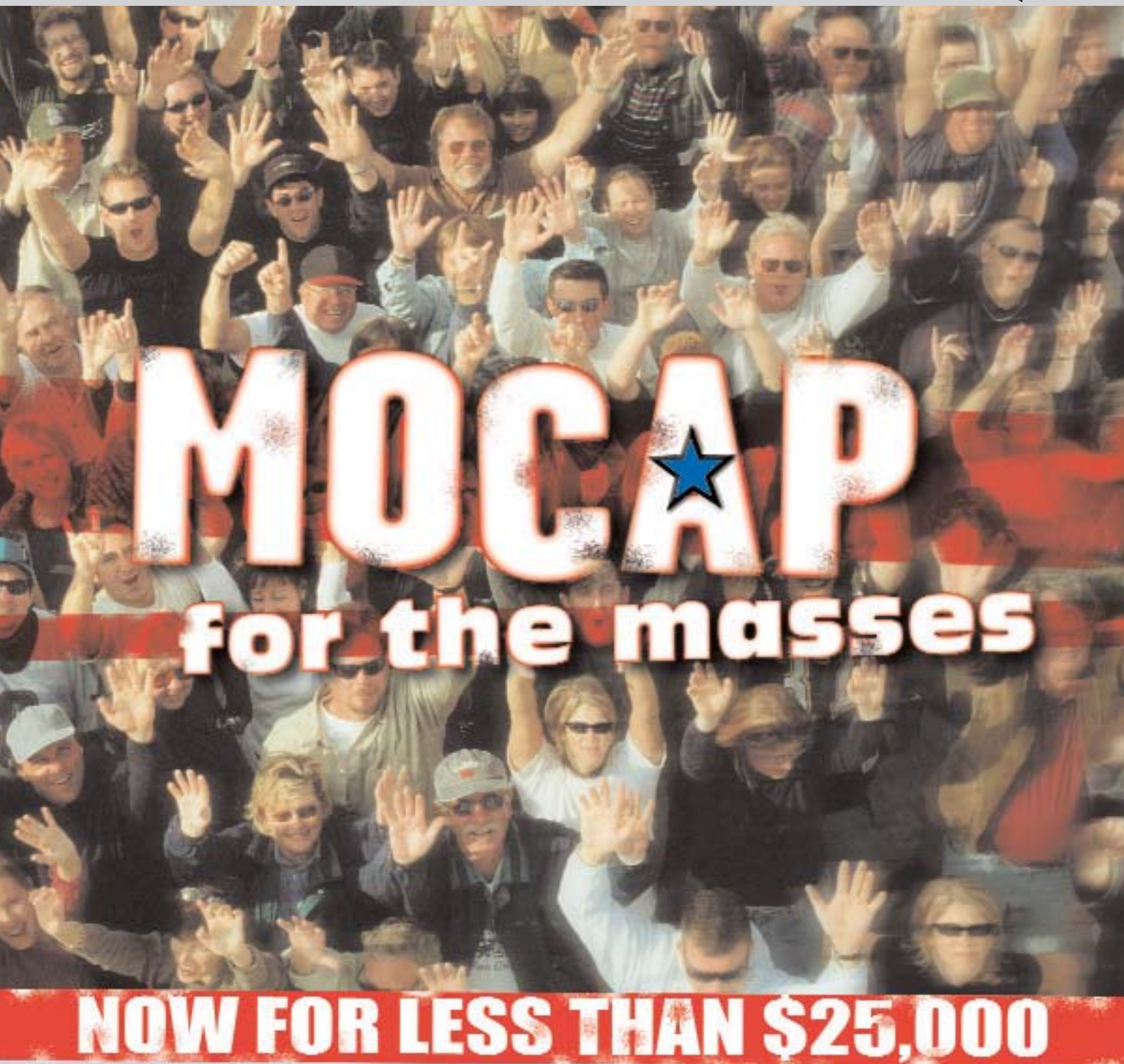
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