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A Little Finesse

Puss In Boots and friends add a bold, new style to Shrek 2

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news, special surveys and reports,
and the online gallery.



14



22



28



32

Departments

Editor's Note 2

Just Pretty Faces?

Spotlight 4

Products

Nvidia's Quadro FX 4000

RTzen's RT/shader

BioGraphic's AI.implant 2.0

Kaydara's MotionBuilder 5.5

Leitch's VelocityHD

User Focus

Finite Elements

Market Outlook, Industry News

Renewed optimism for VFX studios

Accel-KKR to acquire Alias from SGI

Video Viewpoint 10

The HDV Revolution

Portfolio 36

Alienware Design Challenge

Reviews 38

ATI FireGL X2-256t

Dell Precision 650

Pinnacle Liquid Edition 5.5

Products 44

Backdrop 48

Customizable Content

Features

After Effects 14

FILM | PDI/DreamWorks creates a "stylized reality" to help *Shrek 2*'s newlyweds live happily ever after.

By Barbara Robertson

The Alamo Rerendered 22

FILM | Matte World Digital's invisible effects enhance the live action in *The Alamo*.

By Barbara Robertson

Beautiful People 28

VIRTUAL ACTORS | Has CG character designer Scott Billups crafted Hollywood's newest stars?

By Jenny Donelan

Double Coverage 32

MULTIMEDIA | Nike scores with a commercial campaign that appeals to both TV and Web viewers.

By Courtney E. Howard

On the cover:

The swashbuckling Puss In Boots defines the bold, yet refined new look of the 3D animated film *Shrek 2*. For more information, see pg. 14.





**Phil
LoPiccolo**
Editor-in-Chief

Just Pretty Faces?

Digital actors get no respect from film directors and producers. In most cases, that's been for good reason. The so-called "synthespians" that have made it to the big screen have appeared stiff and unnatural looking when trying to walk, talk, and act. But resistance in Hollywood to the new generation of virtual humans is out of proportion to the quality of performances they are now capable of giving.

Fortunately, this may be about to change, thanks to an initiative by Scott Billups, a renowned synthetic character creator and CG filmmaker. His strategy for finding roles for digital actors has been to create the performers in the image of Hollywood's most appealing stars and, more important, to involve the film community in the process.

Indeed, he recently asked directors, producers, actors, cinematographers, and other influential film people to pick the best-looking features of the stars. He then combined the eyes, noses, lips, and some 20 other favorite features in perfect symmetry, according to a mathematical ratio linked to natural beauty, to build an "ideal" leading man and woman (see the latest versions of the couple below and in the feature "Beautiful People," pg. 28). "An enormous number of people have contributed to this project," notes Billups, who is putting the finishing touches on the digital duo for their debut in his own short film later this year. "Hollywood is vested in this."

How good is the final outcome likely to be? Referring to the man, who is the most complete, Billups contends that "physiologically, he is the perfect representation of the contemporary concept of handsome, applied to an ancient methodology for determining beauty. In other words, he's a good-looking dude."

Of course, there's more to being attractive than simply having the most beautiful and most symmetrical faces. In fact, the most popular actors do not necessarily have the best-looking features. For example, the actor with the highest "Q" rating (or popularity quotient), which correlates to box-office draw, is Julia Roberts. But her features received among

the fewest votes of all the Hollywood stars. So, clearly, her personality and her ability to connect with the audience are what set her apart.

What this suggests is that the real challenge will be to give this ideal-looking pair appealing personalities. And Billups, for one, does not believe that traditional kinematics, or physically animating characters, is the appropriate technique for conveying personality. The best way to do it is to capture performances from people who

act for a living. "I've got 10,000 morph targets for the man, and even more for the woman," he says, "so they're going to move pretty realistically."

How far are we from seeing convincing performances from digital humans? "We're there," Billups insists. They may not stand up to extreme close-ups, but "they're ready for the 'two-shot,'" he says, referring to medium close-up shots with two actors on screen.

Whether these virtual people are ready for leading roles remains to be seen. But they will represent another chapter in the evolution of digital actors. At the very least, they may get Hollywood movers and shakers to sit up and take notice. And if they are able to create a splash and draw some attention to themselves, that achievement may be the biggest step they could take toward receiving the same respect reserved for real actors. ■



PHIL LOPICCOLO: Editor-in-Chief
phil@pennwell.com

COURTNEY HOWARD: Senior Technical Editor
courtney@pennwell.com

KAREN MOLTENBREY: Senior Technical Editor
karenm@pennwell.com

CONTRIBUTING EDITORS:
Jenny Donelan, Audrey Doyle,
Evan Marc Hirsch, Doug King,
George Maestri, Martin McEachern,
Stephen Porter, Barbara Robertson

SUZANNE HEISER: Art Director
suzanneh@pennwell.com

DAN RODD: Senior Illustrator
danro@pennwell.com

BARBARA ANN BURGESS: Production Manager
barbarab@pennwell.com

MACHELE GALLOWAY: Ad Traffic Manager
macheleg@pennwell.com

KATHLEEN GREAVES: Reader Service Manager
greaves@pennwell.com
(843)705-9243

MICHELLE BLAKE: Circulation Manager
michellb@pennwell.com

MARK FINKELSTEIN: Group Publisher
mark@pennwell.com

COMPUTER GRAPHICS WORLD

Executive and Editorial Offices:

98 Spit Brook Rd.
Nashua, NH 03062-5737
(603)891-0123; FAX: (603)891-0539

CGW ONLINE: www.cgw.com

For customer service and subscription inquiries only:
cgw@omeda.com TEL: (847) 559-7500 FAX: (847) 291-4816
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President and Chief Executive Officer

ADVANCED TECHNOLOGY DIVISION

ADAM JAPKO
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GLORIA S. ADAMS
Director, ATD Audience Development

ATD PUBLISHING DEPARTMENTS

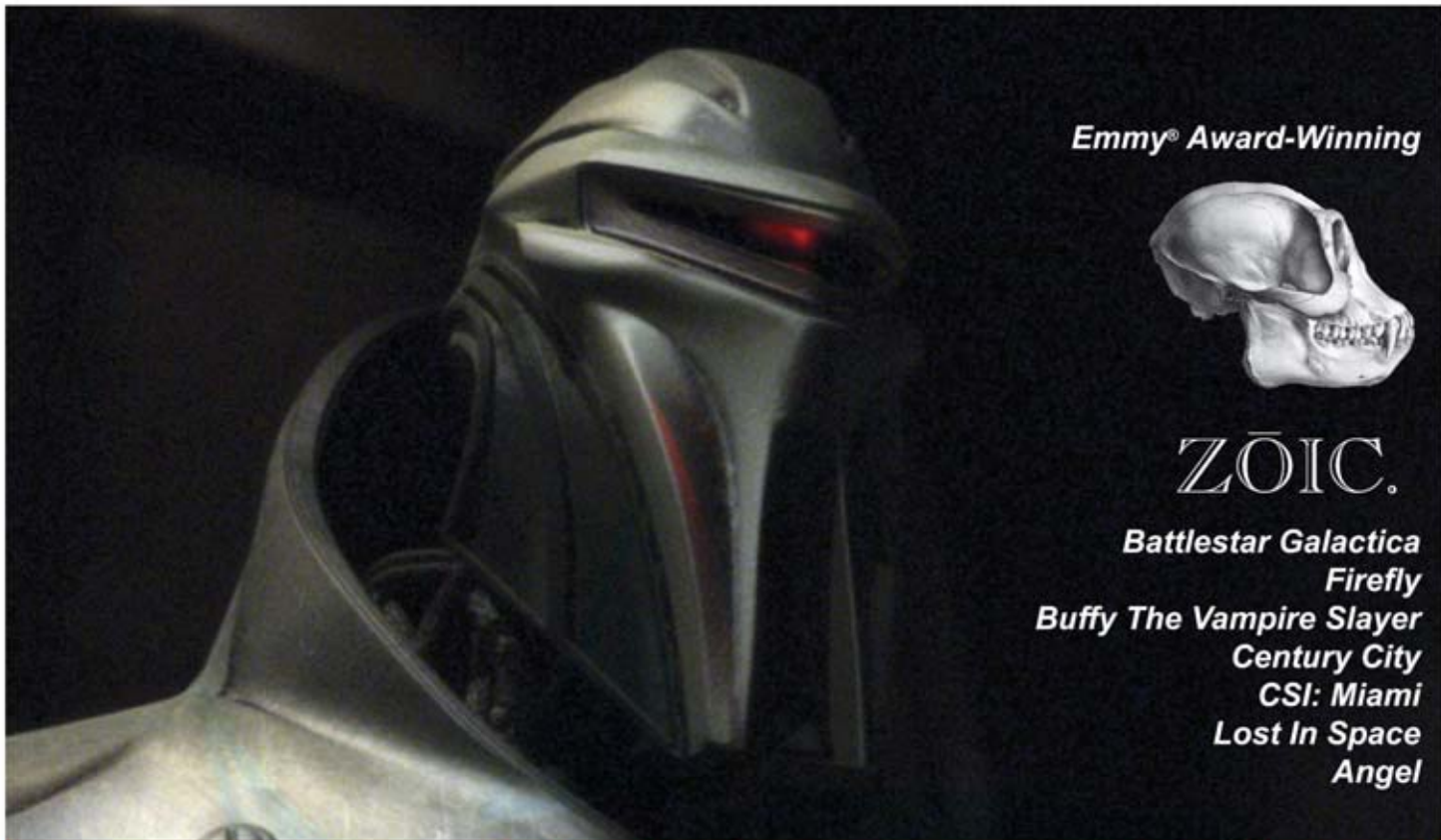
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ATD Art Director

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RTzen and RT/shader Debut at GDC

RTzen made its official debut during the Game Developers Conference (GDC) in San Jose, California. Based in Bellevue, Washington, the company was founded by digital content experts to develop products and technology that empower 3D artists and fuel artistic creativity. All of RTzen's founders—including industry luminaries Jeremy Hubbell, Michael Pittman, and Yoichiro Hibino and 3D veterans Rolf Berteig and Michael Malone—boast more than 10 years experience in the design and management of 3D graphic software solutions, including Discreet's 3ds max and 3D Studio Viz.

Its first entry in the digital content market, RT/shader is reportedly the industry's first visual shader authoring tool capable of generating high-level shading language code automatically and in

real time. RT/shader was designed with a user-friendly GUI, enabling more 3D graphic artists to add increased realism and higher quality to digital content through the use of shaders. RT/shader is available at a cost of \$1995 from RTzen and Turbo Squid. —CEH

■ **RTzen;** www.rtzen.com
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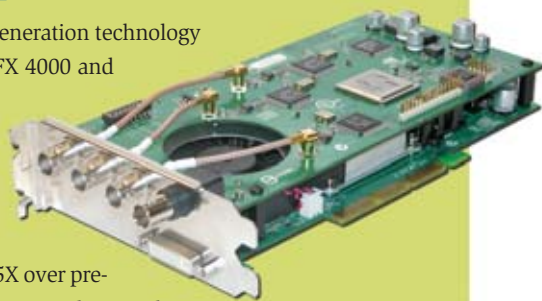
products | graphics cards

Nvidia Unveils Next-Generation Quadro Line

Nvidia has introduced its next-generation technology with the release of the Quadro FX 4000 and 4000 SDI. The first offering in the enhanced Quadro FX family, the Quadro FX 4000 boasts performance gains of 2X and pixel read-back and graphics throughput more than 5X over previous generation graphics cards, according to the company. The Quadro FX 4000 offers support for two dual-link DVI-I connectors for driving displays at up to 3840x2400 resolution rates. Additional features include rotated grid full-screen anti-aliasing for improved image quality, GDDR3 memory, and certification for OpenGL 1.5 and Microsoft DirectX 9.1.

Nvidia also has previewed its Quadro FX 4000 SDI, an innovative graphics card that combines graphics and video functionality. Scheduled to ship in late summer, the new card is capable of not only outputting two streams of video, but also syncing digital and analog video streams. —Courtney E. Howard

■ **Nvidia;** www.nvidia.com
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products | intelligence

AI.implant 2.0 Attracts Attention

BioGraphic Technologies has released Version 2.0 of its artificial-intelligence software for game development, AI.implant for Games. According to the company, this upgrade is the result of two years of working closely with customers, such as Midway Games and Snowcode.

AI.implant 2.0 includes such new features as navigation mesh-based pathfinding, which enhances run-time performance and navigation, and a motion planner to aid in dynamic obstacle avoidance. The company also has rewritten Arena, a multi-platform viewer for game AI.

Using Arena, users can preview how their AI runs on Sony PlayStation, Microsoft Xbox, and PC platforms without exporting to the game engine. The AI.DE AI development editor enables the authoring and editing of AI files in an IDE-style environment, whereas the Brainsuck feature speeds testing and debugging. Version 2.0 is shipping this month for PlayStation 2, Xbox, Windows, and Linux. —CEH

■ **BioGraphic Technologies;** www.ai-implant.com
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Kaydara Presents MotionBuilder Upgrade and Middleware

Kaydara has upgraded its real-time 3D character animation software to Version 5.5. MotionBuilder 5.5 Professional adds support for Python Scripting and CgFX shaders, translating to significant time-savings.

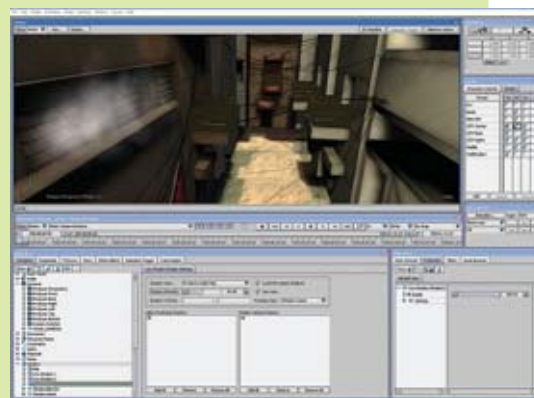
Support for the Python Scripting interactive, object-oriented programming language not only improves MotionBuilder's integration with game studios' production pipelines, but also enables users to automate repetitive tasks. With support for CgFX shaders and Nvidia's Cg shading language, game developers can import and customize shaders to create various effects.

MotionBuilder 5.5 Professional, complete with 12 months of support, is priced at \$4195. An upgrade to Version 5.5 is free to existing users of MotionBuilder 5.0 Professional and

Standard. MotionBuilder is compatible with Windows 2000 and XP, and Mac OS 10.2 and higher.

Kaydara also has launched HumanIK|Middleware, its first middleware offering for game developers. HumanIK|Middleware enables game developers to embed in their game engine the same character animation and rigging technology found in MotionBuilder software. With their run-time engine and animation tool equipped with the same character behavior, users are said to reap improved image quality, flexibility, and productivity.

HumanIK|Middleware boasts seamless integration with MotionBuilder, thanks to Kaydara's FBX file interchange format for 3D data. Moreover, users are able to previsualize character



behavior in MotionBuilder, enabling both accurate previewing and efficient character adjustments during the game-development process. Other HumanIK|Middleware features include a Biped/Quadruped template for defining characters independent of bone structure and motion banks for reusing animations on different characters, regardless of their structure, size, and shape. —CEH

■ **Kaydara;** www.kaydara.com
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Leitch Announces VelocityHD

With its public debut of VelocityHD at NAB2004, Leitch has taken the power of its popular Velocity editing solutions to the high-definition video market.

A format-flexible non-linear editing system, VelocityHD is designed to make HD video editing as efficient and easy as standard-definition (SD) editing. In fact, VelocityHD is well suited to both HD and SD video editing.

Targeted at postproduction professionals, Leitch's new product incorporates the company's own Integrated Content Environment and enables multi-camera editing,



real-time color correction thanks to various manual and automated tools, and previewing via its EyeCon View timeline interface utility. Whereas its Interactive Editing paradigm permits the editing and the use of effects without stopping timeline playback, its Virtual Tape File System assists with interchanging files between video and popular graphics formats. Customizable hotkeys, window layouts, and timeline styles round out Leitch's new offering.

At the heart of VelocityHD is Altitude hardware, which enables full-quality, on-line playback of two HD video streams, two dynamic HD graphics streams, and dual-stream, real-time HD transitions and effects. Altitude supports 1080i, 1080PsF, and 720p frame formats at common frame rates, in addition to SMPTE-292 HD-SDI I/O and VGA HD output. Altitude offers compressed and uncompressed (8- and 10-bit) recording and playback, as well as the ability to mix compressed and uncompressed footage within a single project.

Scheduled for an August release, VelocityHD will be offered as a turnkey system or a hardware/software bundle for qualified Microsoft Windows XP Professional workstations. —CEH

■ **Leitch;** www.leitch.com
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Finite Elements

Sway Studio, along with A52, created a compelling all-CG commercial for Honda in which storm clouds roll into the scene against a white background, and rather than raining “cats and dogs,” it pours toy Mega Bloks that eventually form a Honda Element SUV.

“Purpose” begins with a shot of a surreal sky, comprised of individual blocks. Next, the first raindrop, in the form of a red block, falls. More pieces begin falling in rapid succession until a deluge ensues. Eventually, the blocks form various portions of the vehicle. When the last block falls into place, the SUV rotates for a front view, and the line “Every piece has its purpose,” is read.

“Our goal was to have the spot look natural and present the imaginative and creative concept in a believable way,” says Mark Glaser, visual effects supervisor and Sway founder. To make the impossible seem possible, the team had to connect the idea to reality as much as it could. Making this especially challenging was the speed at which the action occurs, as the artists had just 30 seconds to pile millions of blocks into a

life-size representation of the SUV.

Working with director Roman Coppola, the group first shot the scene using actual camera equipment and a real Element, and then tracked the shots in 2d3’s boujou. This allowed Coppola to capture the nuances and movements of a real camera and transfer that into the CG realm, in NewTek’s LightWave.

After re-creating the camera moves in 3D, the artists modeled, textured, and animated the blocks, also using LightWave. To make the blocks look realistic, the group added subtle details such as swirls, which form on actual Mega Bloks when the plastic flows into the mold. In addition, the team rendered the imagery using subsurface light scattering, which gave the models their translucent plastic-like texture, and lit and rendered them using radiosity so the light falls on the corners and in the cavities.

In addition, the artists created cus-



Artists “reverse engineered” this CG vehicle to achieve an unusual animation sequence.



tomized plug-ins that enabled them to convert the 3D SUV model into one consisting of individual blocks. For the animation, the artists started with a fully assembled block vehicle, then used another customized tool to animate the blocks flying upward—in fact, disassembling the model. For the final scene, the group reversed the animation, thereby showing the vehicle as it was being constructed.

“This project is all about the creative,” says Glaser. In fact, unlike most car commercials, this one never actually shows the advertised product. —KM

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Renewed Optimism

Business is starting to pick up this year for many visual effects studios and facilities. Many studio owners are more optimistic today than they were during the summer of 2003. In fact, the number of US studios and facilities that say they expect business this year to be "excellent, much better than in 2003" jumped by 18 percent to nearly half (49 percent) in the past six months. The bright spots include Web and interactive media companies, broadcast and cable studios, animation and effects studios, and postproduction facilities.

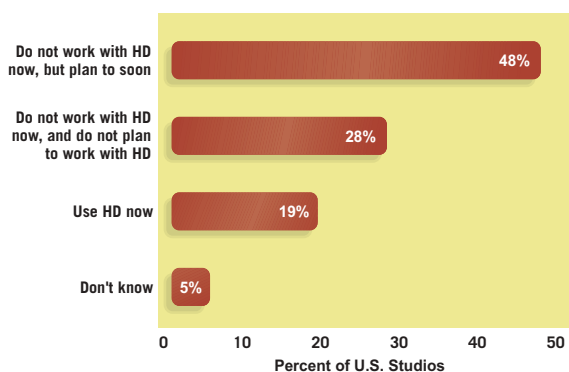
What's driving this renewed optimism? New projects remain the top new business opportunity for 93 percent of all studios and facilities—up 6 percent from a year ago. At the top of this list are corporate projects, television commercials, multimedia and DVDs, television con-

tent, and Web and interactive media projects. Many studios and facilities expect new business this year and, as a result, have been investing in production and creative capabilities—and hiring more employees—to help them win new projects and improve productivity.

More studios and facilities are incorporating the Web into their businesses, while at the same time, existing Web and interactive media companies say their business has improved. Some of the reasons for this trend include improved Web technology, the continued adoption of broadband, and movement of Web-based media and plug-and-play media devices into the living room. Moreover, many clients today expect their projects to be output for delivery via the Web, and for many studios and facilities, the Web is one of their primary sales and marketing tools.

Another industry trend is the use of high-definition (HD) video among the professional video community. Some 19 percent report currently using HD in their production, and almost half (48 percent) say they plan to use HD in production soon. Independent filmmakers top the list of those acquiring or shooting in HD, followed by post facilities and FX studios. Among those using HD, the top two formats are Sony's HDCam and Panasonic's D7HD (DVCPRO HD) format. Of the two, we expect HDCam SR's 10-bit 4:4:4 HD to be the wave of the future. —Jim Whittington, principal of market research firm TrendWatch, Inc., Mill Valley, CA.

HD Use in Visual Effects Studios



Source: TrendWatch Visual Effects/Dynamic Media Report—Issue #4, Winter 2003–2004

In Brief

The **University of Southern California's** (USC; Los Angeles) **School of Cinema-Television**, in partnership with publisher **Electronic Arts** (EA), plans to add a Master of Fine Arts (MFA) degree in video game design beginning in the fall of 2004. Electronic Arts presented the school with a multimillion-dollar gift to help fund the program. EA president Don Mattrick will join Jeffrey Katzenberg and Steven Spielberg on the school's Board of Councilors. The USC School of Cinema-Television is celebrating its 75th anniversary this year. **Square Enix** (Tokyo), developer of the popular *Final Fantasy* and *Dragon Quest* game franchises, announced its acquisition of **UIEvolution**, a wireless software company based in Bellevue, Washington. UIEvolution will serve as the research and development center working on the advancement of

mobile and broadband platforms as well as technologies that aid Square Enix in producing new network-based entertainment. Several Disney character animators have joined forces to form **Project Firefly Animation Studios** (Orlando). The new company was co-founded by Paulo Alvarado, Gregg Azzopardi, Dominic Carola, John Webber, and Glen Gagnon—who collectively worked on such Disney projects as *Brother Bear* and *Treasure Planet*. From its offices on the Universal Studios Florida back lot, Project Firefly will create family-friendly animations that combine 2D and 3D technologies. Technology-focused private equity firm **Accel-KKR** (Menlo Park, CA) announced a definitive agreement with **Silicon Graphics Inc.** (SGI) under which Accel-KKR will acquire **Alias** from SGI for \$57.5 million. —CEH

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The HDV Revolution

By Jeff Sauer

It's been about a year and a half since JVC's consumer division introduced a camcorder, the GR-HD1, able to record High Definition Video (HDV) onto a MiniDV cassette. And, it's been a little more than a year since JVC's professional division launched its version of the product, the JY-HD10, at the 2003 NAB convention. At those introductions, both products gained significant notoriety

for technical achievement, but, admittedly, there were skeptics.

After all, JVC's original positioning for this new HD-on-DV format envisioned a high-definition future with consumers shooting vacations and birthday parties in HD and playing them back on JVC's plasma television monitors. At the time, however, few consumers had those HD-capable TV sets, and professionals were understandably leery of single-CCD camcorders serving any serious purpose. (Both the GR-HD1 and the JY-HD10 have just a single CCD, rather than the three CCDs—one for each primary color—of more professional camcorders). Minimally, it's counterintuitive to expect a camera equipped with limited color and light sensitivity

JVC's under-\$4000 JY-HD10 camcorder set the bar for affordable High Definition Video (HDV). Now other vendors are readying similar models and supporting a new HDV format that builds on JVC's technology.



ty to try to stand up under the detail-revealing scrutiny of high-definition pictures.

However, the future has changed quite a bit over the past year. HDTV has gone from 15 years of hype to a regular production format for several prime-time and late-night television programs, as well as many sports broadcasts. HD motion-picture production, led by George Lucas and *Star Wars Episodes I and II*, is also gaining momentum. More important, for increased mass awareness, prices on HD-capable displays, including flat-panel plasmas and LCD TVs, are dropping, and an increasing number of cable and satellite TV providers are offering HDTV channels.

With that expanding awareness of HD comes the burgeoning aspirations of videomakers at all levels to shoot in HD, making JVC's basic idea of affordable HD production intriguing for videographers of more modest means. Even with its early single-CCD implementations, JVC clearly struck a chord with the independent video community. That's not to say that JVC has had a runaway success, although the "pro" JY-HD10 has had its share of vocal early adopters. Rather, the notion of affordable HD production has piqued curiosity.

JVC's competition recognized it, too, and that spawned a remarkable industry consortium. This collaboration of competitive camcorder makers (Sony, Sharp, and Canon) has now expanded and refined JVC's idea and coined the HDV moniker. Thus far, more than a dozen and a half editing-system, image-processing, and chip manufacturers have formally expressed support for the newly formed HDV standard, with several already including support for HDV in current products.

Admittedly, current claims of HDV support tend to put the proverbial cart before the horse. While an HDV standard has emerged in a basic form, that new standard goes beyond JVC's early camcorder implementations and, while HDV will undoubtedly beget more camcorder models for a variety of manufacturers, as yet none exist. Still, the simple fact that several companies are jumping in early is proof positive that interest in this new, affordable way to produce HD content is strong.

As of this writing, prior to NAB 2004, no new domestic HDV camcorders have yet been announced, although in March Sony Europe showed an unnamed three-CCD PAL HDV camcorder (roughly in the form factor of Sony's VX2100) that is expected to



Jeff Sauer

is a freelance writer, video producer, and director of the Digital Video Group, an independent testing and research organization for digital media.

HDV, like DV before it, is changing the shape of video and post-production

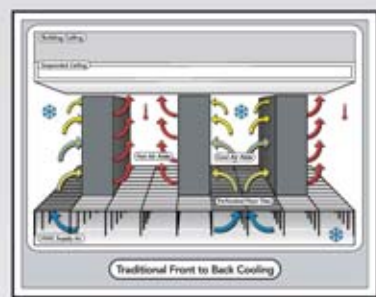
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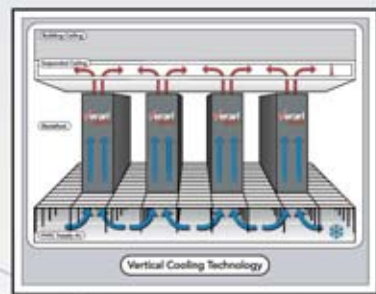
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sell for less than \$5000 later this year. JVC and Sony have both let be known their respective intentions to demonstrate at least one HDV model at NAB. Sony's is expected to be an NTSC version of the European product, and JVC's, rumor suggests, is a larger, shoulder-mounted camcorder in the style of JVC's GY-DV5000, with 3 2/3-inch CMOS CCDs and the ability to record to MiniDV or larger "standard" DV cassettes with up to 270 minutes of recording time. But, that won't be available until late in the year.



Panasonic is staking out the high end of the HDV market with its AJ-HDC27 camcorder based on the DVCPro-HD format.

What's HDV?

Like DV, HDV writes digital data to a tape cassette in a camcorder. The difference is that whereas DV is an intraframe, Motion-JPEG-like compression format, HDV compresses to MPEG-2, the format for DVDs and DTV. And since MPEG-2 compresses pictures both within the frame and temporally over a series of frames, or Group of Pictures (GOP), it can achieve much smaller file sizes for the same picture quality—or, in the case of HD, much higher resolution at the same file sizes as standard-definition DV.

JVC's existing JY-HD10 can record in both traditional 25Mbps interlaced 720 x 480 DV as well as HDV's 19Mbps 30-frame progressive mode at 1280 x 720. It also uses MPEG-2 to record at 720 x 480, but in 60-frame progressive. (Several DV camcorders today can internally process 60-frame progressive, but because of the limited bandwidth of 25Mbps DV tape, they effectively throw away half the information and record either 60-field interlaced DV or 30-frame progressive DV at 720 x 480.) Both the 720/30p and 480/60p modes of the JY-HD10 compress audio as MPEG-1, Layer 2, 16-bit, 48kHz stereo streams, encoded at 384Kbps. JVC also includes familiar FireWire transport for moving footage onto a computer.

However, the consortium's HDV standard goes further to include 1080i HD, or interlaced 1440 x 1080, using the DVCassette's full 25Mbps. Curiously, the HDV standard defines the 19Mbps, 720p mode as an MPEG-2 transport stream, the same used by JVC in its exiting products, but uses "packetized" elementary streams for the 1080i mode. HDV uses a typical MPEG-2 4:2:0 chroma subsampling rate.

The glaring omission of the HDV consortium is the lack of any provision for 24-frame progressive. Since that is such a common frame rate for HD video production, one has to

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figure that marketing agendas got in the way of technological advancement. And, that's too bad, and also probably unnecessary.

Today, Sony and Panasonic are both enjoying the increasing success from their respective HDCam and DVCPro-HD formats. And, 24p is one of the major attractions of products like Panasonic's AJ-HDC27 VariCam (\$63,000) and Sony's HDW-F950 CineAlta (\$115,000) because of its flexibility in converting to 24fps film, 25fps PAL video, or 29.97 (30fps) NTSC video. The fear, presumably, is that the dramatically lower prices of future HDV camcorders will eat away at those gains in the professional marketplace, just as DV did to traditional analog formats. After all, JVC's JY-HD10 is just \$3995 and Sony's yet-to-be-official three-CCD camcorder will be, by reports, under \$5000. It's easy to see HDV camcorder sales cutting into the higher margin "professional" products. Or is it?

Panasonic, conspicuously absent from the HDV consortium, argues that the limited bandwidth of HDV is not sufficient for the quality necessary for true High Definition. Indeed, stories abound of how going to HD has forced newsrooms to completely revamp their sets because details that were once hidden by the imperfections of standard definition NTSC video became obvious and exposed by the higher resolution.

And certainly there is a difference. Panasonic's DVCPro-HD samples at 4:2:2 instead of 4:2:0 and runs at 100Mbps, four times the rate of HDV's 1080i and more than five times that of HDV's 720p mode. That's some serious compression for unforgiving HD content. Sony's HDCam SR format, used by Lucasfilm and others, can go as high as 440Mbps and has a mode for 4:4:4 RGB sampling. What's more, the simple quality of image components and lenses in such inexpensive camcorders can't come close to matching the quality of the professional gear "necessary" for true HD video.

Still, it's easy to draw similarities to MiniDV in late 1995. Professionals then viewed DV as a "low-end" format: a nice solution for the event videographer but not the serious producer. But DV, along with editing products like Apple's Final Cut, Adobe's Premiere Pro, Avid's Xpress DV, and others from Ulead, Pinnacle, and Canopus, changed the shape of video and postproduction. DV brought waves of new videomakers into the business and freed others from the bonds of expensive post-production suites.

Time has settled many of those early DV debates about "good enough" quality, enabling and empowering many, but also reaching limits beyond which now lie appropriately more expensive solutions. With history as a guide, it's not hard to envision a similar place for HDV as an affordable high-definition format that opens doors and offers opportunities to those with talent and vision. ■■

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Secret

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PDI/DreamWorks develops
tools to help Shrek and Fiona
live happily ever after

By Barbara Robertson

The tremendous critical and financial success of *Shrek*, which received the first Best Feature Animation Oscar and earned more than \$480 million dollars in box-office revenues, made a sequel inevitable. But when the green ogre married beautiful Princess Fiona, the fractured fairy tale had its perfect ending. So, what could the plot masters for *Shrek 2* do?

"We take up where the story left off," says Andrew Adamson, writer-director of PDI/DreamWorks's *Shrek 2*, which opens May 21. "We examine what happens 'happily ever after.'" For the newlywed ogres, the honeymoon ends when Shrek (Mike Myers) and Fiona (Cameron Diaz) receive an invitation to the Kingdom of Far, Far Away from Fiona's parents, King Harold (John Cleese) and Queen Lillian (Julie Andrews).

"It's what we all go through," says Adamson. "You marry the whole family. The parents expected Fiona to come back with her Prince Charming, but the Prince was too late, and now they have Shrek. The mistake a lot of people make is trying to find a fairy-tale conceit and a modern equivalent. We find real conceits and then find the fairy-tale equivalent."

One of those equivalents is the land of Far, Far Away itself, which looks like a fairy-tale version of Rodeo Drive and Hollywood. "A large part of what we do in Hollywood is manufacture contemporary fairy tales, so it seemed an appropriate place to target," says Adamson. "We found a tone last time that we could play with and expand this time. There's more satire and more parody. Because we can have more interrelations with characters, we can have a more complex story."

Shrek, Fiona, and Donkey's journey to the Kingdom of Far, Far Away set this fractured fairy tale in a land ripe for parody and demanding of new, art-directed tools for handling crowds of townspeople and new leading characters.



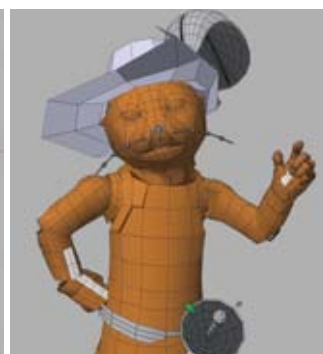
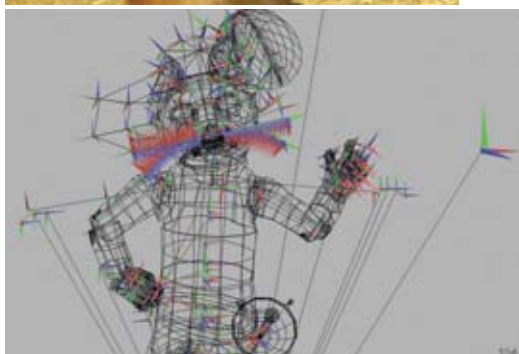
Art Directed Complexity

In *Shrek*, many of the scenes had, at most, Fiona, Shrek, and Donkey (Eddie Murphy). In *Shrek 2*, Fiona's parents, her Fairy Godmother (Jennifer Saunders), Prince Charming (Rupert Everett), and Puss In Boots (Antonio Banderas) all have leading roles as well. In addition, thousands of people live in Far, Far Away, including recognizable fairy-tale characters and parodies of the rich and famous.

New tools—faster hardware, primarily dual-processor Pentium 4 machines from Hewlett-Packard, and new in-house software—made it possible for the crew to cope with all of these characters and with additional complexity in the environment as well. “Every blade of grass, every leaf, every cloud in the sky is synthesized,” says Andy Hendrickson, head of technology at PDI/DreamWorks. “It’s all CG, all of the time. Right now we have 3500 processors working on the show. It’s one of the biggest renderfarms I’ve managed.”

This is the third 3D feature animation for PDI, and with this film, the R&D crew focused largely on ways to give artists more control—from more facile interfaces for the animation system to art-directed control of simulation systems. In addition, the technical team created new effects and lighting tools and put a new renderer—first used for the stereo 3D ride film *Shrek 4D*—to a major test. “We upped the ante from *Shrek* in tool-making as well as image-

The rigging (at bottom, left) for Puss In Boots (final at left; flat shaded at bottom right) was complicated by the requirement that he could act like a biped or a four-footed cat, wave a hat that has an attached feather, hitch up his belt, flick his tail, and take off his boots.



Prince Charming and Fairy Godmother were but two of the stylized humans added to the cast for *Shrek 2*. New subsurface scattering and global illumination techniques developed at PDI helped soften their CG edges.

making,” says Arnauld Lamorlette, head of ef-

Such Characters

fects, who notes the goal was to make art-directable tools. “The imagery is not photoreal. It has a sophisticated, stylized reality.”

On the surface, the three returning stars—Shrek, Fiona, and Donkey—didn’t change much. Beneath the surface, though, the characters were rigged with new animation controls. “The facial animation system was rewritten to work on higher-resolution models and to work faster,” says Tim Cheung, supervising animator. “Before, we would work with only a rudimentary mask of the faces. Now, we see high-resolution faces move. In general, there is more serious acting in *Shrek 2* and less action, so we had to have subtle facial animation.”

In addition, the Character TD team applied the updated, muscle-based, award-winning facial animation system to the characters’ entire bodies in a simplified form. “There was a big development effort to help the animators create more believable characters,” says Lucia Modesto, co-character technical director supervisor. “The additional animation controls and increased model resolution gave the animators control over more subtle details.”

Of all the major characters, Puss In Boots’s animation rig was the most complex. “He’s a very complicated character with a

belt, tail, hat, whiskers, and boots,” Modesto notes. “When he’s wearing boots, his foot has to be a biped human-like foot,” she says, “but when he’s out of his boots, he has a cat foot with an extra joint.” To solve that problem, the TDs created a rig that let animators toggle from a four-footed setup to a biped. They also added Puss’s hat to the rig. “It was cumbersome for animators to parent it, so we made it part of the setup,” she says.

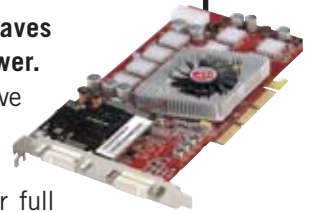
To help add subtlety, the character TD department also rigged some muscles to move automati-

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Shrek couldn't change much for the second film; however, he was given more subtle facial expressions, thanks to new animation tools that allowed animators to work with higher-resolution models and some body hair.



cally. For example, Prince Charming's neck muscles tighten automatically when he clinches his jaw, and if he takes a drink, his Adam's apple bobs up and down.

Five teams of animators worked on the film, with five to six animators on each team. In addition to creating performances for the main characters, the animators were charged with moving other objects—notably Shrek and Fiona's cart, and a medieval type of contraption used in an escape attempt. Also, animators working closely with the effects teams created cycles for crowd animation. To help make these performances fit into the stylized world, all the characters, whether primary or secondary, were given realistic skin, hair, and clothes.

Skin Deep

Soon after the first *Shrek* film opened, Stanford professor Henrik Wann Jensen (now at UCSD) drove to PDI to explain his research on subsurface scattering. "During his talk, I got an idea for doing subsurface scattering in a new way," says senior effects developer Juan Buhler. That idea led to a SIGGRAPH paper co-authored with Jensen, as well as to the technique's use on leading characters in *Shrek 2*, and because it reduced the computational requirements for subsurface scattering, to its use on crowds.

Buhler describes the technique: "When light enters a translucent object, part of it reflects and part goes inside and bounces around. So, when we render pixels, there's a lot of computation because we have to consider the light falling on surround-

ing pixels. My idea was to separate this into two processes."

First, an object is covered with points, and then the illumination of each point is calculated individually. The result is a cloud of colored points in the shape of the object; the points have various degrees of brightness. To render pixels and create the final image, the illumination of the pre-calculated points is averaged within a radius, and a translucency value is assigned to the result. "Say, for example, the object is an ear with different thicknesses in different parts," Buhler explains. "Where it's thin, more of the points will be bright than where it's thicker."

To create the final look, new texture shaders written by senior effects animator Jonathan Gibbs managed several layers of skin and texture maps, adding visual complexity with such elements as dirt, oil, freckles, moles, bumps, colors, and specularity. "We had half a dozen sets of texture maps for each part of each main character," says David Doepp, surfacing supervisor. "Each set had around 100 maps, and the characters had 70 to 75 parts."

Wild Hairs

With a cast that included humans as main characters, thousands of townspeople, plus a cat, a donkey, and a horse or two, the technology teams for *Shrek 2* paid particular attention to the problem of creating and simulating hair and fur. However, for hair with extreme motion, the team relied on Alias's Maya for simulation, most of the hair was animated as part of the character setup. For this, the team created new setup tools. "We had more than 200



It takes powerful magic to turn a donkey into something beautiful, not to mention dynamic hair simulation for his mane and tail.

controls for setting up hair styles,” says Gibbs. “We had to change the user interface.”

Michael Day, lighting sequence supervisor, explains that the team called in a wig maker to help devise a simpler approach. “The hardest thing is to style hair and know what you’ll get without running the simulation,” he says. To help the artists see what the hair would look like, the crew first modeled curves in Maya to create guide hairs that would be used for the simulation. Those hairs were extruded as big tubes and exported into PDI’s proprietary software; the tubes represented the volume of hair and were then exported into PDI’s proprietary software.

Then, the team applied parameters such as curliness to the tubes and interpolated them, which produced more, smaller tubes. They could look at the results, set new parameters, and continue interpolating until the tubes became small enough to look like 92,644 hairs, in fact, on Prince Charming’s head. A “clumpiness” parameter controlled whether the hairs would try to stay in the tubes or not and, thus, how messy, smooth, or clumpy the hair would look.

The simulation engine moved the guide hairs from frame to frame based on these parameters and on the character’s movement. But even for this, the team provided artistic control. “We set magnets that would pull the hair in particular directions and then ran the simulation on top,” says Larry Cutler, co-character technical director supervisor. “The magnets would control the simulation, but the animators could control the magnets.”

Once the hair was simulated, it was interpolated as part of the rendering process with the guide hairs controlling the hierarchical levels of clumpiness according to parameters set earlier. Also in rendering, color ramps were applied and volume shadows were calculated.

For fur and body hair, texture maps controlled direction, length, density, and color. “Sometimes we could paint texture maps once for the characters, says Doepp, “but when Donkey and Puss are in the rain, we had to change both the direction and the specularity of the fur.”

Puss caused additional furry problems. “He wears a belt that slides and smooshes the fur,” says Gibbs. “We had to track the belt over the surface, and then generate a texture map for each point that controlled how much and in which direction the fur would lie down along the moving belt line.”

Other improvements for the characters included better integra-



Prince Charming’s hairdressers at PDI applied red magnets to his golden locks that animators used to direct his hair simulation.

tion of both tight clothes (created with PDI’s in-house system) and loose clothing (simulated with Maya Cloth), as well as better eyes. “On the first film, we had a line between the tight cloth and the simulated cloth, so the characters wore belts, but on this film the Queen and Fairy Godmother do not have to wear belts,” says Ken Bielenberg, visual effects su-

pervisor. Lamorlette explains that all the characters’ eyes—even those of the thousands of people in the crowds—include caustics and also refractions when a character looks sideways.

A new “finaling” group fixed any problems with the characters before they were lit. For example: “If a character’s contortion caused the simulated cloth to interpenetrate the model under the arm, we might sculpt out the armpit to make the simulation act OK,” according to Bill Seneshen, senior effects animator. Also, the team would sometimes dy-

Environmental Changes

Adding to the visual and technical complexity for *Shrek 2* were organic settings with atmospherics such as rain. In one sequence, the characters are caught in a downpour. “We had geometry changing dynamically on characters’ faces as water flowed on the surface,” says senior effects animator David Allen. For rain, the team used a particle-driven simulation.

“The simulation particles used the surface information so that they could drip water off the face,” says Allen. “We generated blobbies from the particles in different thicknesses and rendered them with refractions.”

For a scene in which flaming rocks are flung through the air, the team used smoke spheres driven by a particle simulation. “The spheres were replaced by volumetric noise and rendered using self-shadowing technology,” explains effects animator Matt Baer.

Other sequences used CG water simulations, for which the crew developed new techniques to generate surfaces and foam for the studio’s award-winning fluid-simulation engine. “There’s a magic potion that’s spilled in a factory, and because it’s magic, interesting things are happening with it,” says Lamorlette. “We had to develop tools that could tweak and cheat and twist the laws of physics.”

New tools also helped artists quickly create 3D plants and foliage. For example, working from a style and color of a leaf approved by the art director, modelers would create several versions that would be rendered by the effects team. “Then we generated sprites that we put in Maya

Paint Effects,” explains Lamorlette. The artists painted in Maya, using these little sprites to visualize a 3D environment. When they finished, we exported the data from

Maya into our system, and created and instanced it in 3D. This gave the artists control over several million polygons in an interactive way. There are flowers and vines all over this movie.” —BR



To help make Donkey’s hair look wet, PDI’s lighting and effects crew changed the specularity and made it slightly darker.

namically deform geometry at this stage to, perhaps, make a finger look like it was really pushing on something. "We tried to get rid of everything that looked CG," says Lamorlette.

Illuminating Globally

Techniques such as these helped soften the hard edges of the synthetic world, but new lighting techniques had arguably even more impact. Rather than always lighting scenes using CG key lights, fill lights, and so forth, the team decided to incorporate global illumination in the studio's new integrated rendering and lighting tools. "We wanted to create a warmer, more believable look," says Lamorlette. "But we had to make the technique faster

to use it on such a large scale."

Crowd Control



Many of the advances made for the star characters, such as special shaders for their eyes, subsurface scattering, and hair and cloth simulation, were also applied to secondary and crowd characters.

To create the thousands of secondary characters, the team started with five body types (two men, two women, a child), as well as several types of heads and a variety of outfits that they could mix and match fairly automatically. "The crowd system knows the rules," says Cutler. "A maid doesn't go to the ball; a skirt with a high waist is matched to a high bodice."

Some of the secondary characters even had speaking parts. "Shrek 2 was 10 times more sophisticated than Shrek," says Modesto, explaining: "The waiters at the dinner are secondary characters. For these, we could change face shapes without having to tweak underlying rigging that was the same for all the secondary characters."

Secondary characters used in crowd simulations moved according to cycles developed by animators. "The system managed 1300 animation cycles," says effects animator

You can't have a kingdom without subjects, which meant the crew at PDI needed to develop new tools for creating, animating, lighting, and rendering thousands of townspeople.

Seth Lippman, "plus all the parts—heads, hats, and so forth—and the cloth and hair simulations." Given this complexity, the technical team devised methods of reducing the computational and storage load, and yet found ways to give artists control over the simulations. "We developed a system we call Dynamic Crowd Character," says effects artist Scott Peterson. "We bake out all the character types and store them on disk for every frame, so we came up with a geometry-based compression scheme that reduces the storage to one-third of what it was. Even so, we can override the pre-baked characters to have per-character variations created procedurally or with hand animation." —BR

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Also, rather than using this physics-based lighting technique to mimic reality, the team needed to be able to create a stylized reality. "Tightly coupling the rendering and lighting tools gave us flexibility and optimization," says Hendrickson. "Having a lighting tool in your renderer is a big advantage you don't often see in the outside world."

Eric Tabellion, who helped create the new lighting tools, notes that PDI's implementation of global illumination, which he describes as similar to radiosity, includes radiance caching (to speed rendering) and a method for reducing the computational complexity. "We can replace a castle with a simple plane," says

Philippe Denis, lead lighter. "This allows us to select how much complexity is involved."

Although the new lighting tool can create soft, diffuse lighting for an entire environment, the biggest impact in this film has been on individual characters. "We used to struggle to light characters under their chins without getting harsh shadows," says Bielenberg. "The more we can break down the harshness, the more we can move viewers into our world. At first, the lighters would use global illumination only sparingly, but now it's used in every shot, and always for the characters."

The impact of such tools as these extends beyond surface appearances; the new tools have a more fundamental role to play. "Shrek was a training ground for the story," says Adamson. "There were technical and aesthetic things we could not do then because of computational limitations and software that wasn't done. But now, the technology is challenging me and others to create even more complex stories." ■

Barbara Robertson is a contributing editor for Computer Graphics World and freelance journalist specializing in computer graphics, visual effects, and animation. She can be reached at BarbaraRR@comcast.net.

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The Alamo RERENDERED

Matte World Digital uses a variety of 2D and 3D tools
to conjure up the historical battle of The Alamo

By Barbara Robertson

On February 23, 1836, some 180 people—Americans who had settled in a northern part of Mexico

called Texas, as well as the Tijanos who lived there, and a group of cavalry men—prepared to defend a fort called the Alamo from attack by Mexican forces. The rebel army had captured the fort from Mexican General Marin Perfecto de Cos the December before. But this time, Mexican General Antonio Lopez de Santa Anna arrived with an army of thousands, and on March 6, recaptured the Alamo, leaving all the defenders except women, children, and one slave dead. Within two months, on April 21, General Sam Houston led a surprise attack on Santa Anna and his forces. This time, the Texans won the battle and, with it, independence for the Republic of Texas. The battle cry, “Remember the Alamo!” echoes today.

For a scene in which Davy Crockett takes a bow on stage during a play about him, Matte World Digital replicated the audience (top) to create a full house and removed modern-day artifacts to create the final shot (bottom).





Six-foot-tall tracking markers set along the rail (bottom) helped Matte World artists derive the camera move and assemble 12 shots of groups of soldiers into the final shot (top).

In April, Buena Vista Films released the latest feature based on the historic battle and aftermath. Directed by John Lee Hancock, starring Dennis Quaid as General Sam Houston, Billy Bob Thornton as Davy Crockett, and Emilio Echevarría as General Antonio Lopez de Santa Anna, *The Alamo* attempts to stay true to history while honoring the legends.

Although visual effects play a role, you won't see them—or at least you won't if the effects are successful. "This is not a visual effects show per se," says Craig Barron, visual effects supervisor at Matte World Digital. "But innovative effects are happening all through the film. We hope the audience just figures we shot everything for real."

Much of the filming took place on a massive set built on a ranch outside Austin, Texas, where a village representing San Antonio de Bexar was constructed. Slightly outside the village—and the set—was the Alamo, a mission fort.

Often Matte World Digital would sweeten shots of Bexar and of the Alamo, adding emotion to a shot by painting clouds in the sky, even changing the moon to the historically correct phase in a night shot of Bexar. "This was a first,"

says Paul Rivera, chief technical artist.

Using Adobe's Photoshop and Alias's Composer, the crew modified a theater in which Davy Crockett appears. "We made the interior smaller, removed the art deco elements, exit signs, wheelchair ramps, and everything else that would not have existed in 1836," says Barron. The audience was composited from multiple passes of 200 costumed extras who switched seats for each shot. But these typical fix-it-in-post shots were not typical of the work done at Matte World Digital for this show.

The Long March

Sent by Sam Houston, Colonel Jim Bowie (Jason Patric) and 25 men arrived in San Antonio on January 19; Lieutenant Colonel William Travis (Patrick Wilson) and his company of 30 arrived February 3, not expecting Santa Anna to show up before spring. But when Davy Crockett showed up on February 8 with 12 Tennessee Mounted Volunteers, they were chased into town by the Mexican army, which was gathering on the outskirts of town. Santa Anna had mercilessly marched his troops some 350 miles from Saltillo through the moun-

tains of northern Mexico, through rain, snow, and ice, to San Antonio.

The march was shot in Austin with 236 men dressed in Mexican military costumes traversing open fields dusted with artificial snow. It would be up to Matte World Digital to convert the open, sunny landscape into a wintry march through the mountains.

The studio created the terrain with Discreet's 3ds max using data from Camera Control's Milo motion-control camera and then projected textures painted by digital matte artist Chris Stoski onto the landscape seen by the virtual camera. The soldiers were rotoscoped out of the live-action plate using Pinnacle System's Commotion and added to the terrain. The snow, created with max particles, was rendered in layers. "We had more than 10 levels of snow," says Rivera, "from blowing snow in the foreground to a haze in the distance." The compositors used cues from live-action elements to know where and when to place flurries of snow in the foreground; motion blur was added in compositing. "We'd bring in the snow in the right ratio to a blowing flag," says Rivera. "Advance planning helped us put the shot together quickly."

Setting the Siege

On February 23, Santa Anna reclaimed San Antonio. For the dramatic scene of General Santa Anna riding through the square with his generals past thousands of his troops, Matte World Digital needed to create thousands of soldiers standing at review from groups of 200. First, the effects crew shot the riders trotting through the empty square. Then, 12 sets of the groups were filmed with a static camera in different sections of the square. “We checked with the historian on location and found out that the Mexicans didn’t salute,” says Glenn Cotter, 3D artist. “But, it was important that they not look like static elements, like we painted them in. We wanted to have some movement among the troops standing at attention, so as Santa Anna rides by, we had them shoulder rifles, present arms.”

The 12 sets of 200 troops were then assembled so that it looked like Santa Anna was riding past them. “Because the riders were shot with a camera that panned but did not move through space, there’s no parallax,” says Cotter. “So, we could project the individual groups on the inside of a sphere.” The live-action camera was tracked, and that movement was matched with a CG camera that panned across the images of the troops assembled on the inside of the sphere. In addition, composers added clouds to the shot.

That night, the siege began. Inside the Alamo, Davy Crockett played his fiddle to inspire the Alamo defenders. Only a short distance away the Mexican army surrounded the Alamo and prepared to pound the fort with cannon and rifle fire. To add drama



To create a mountainous landscape, the crew applied texture maps to a terrain modeled in 3ds max (top). The troops were then composited into the CG landscape (bottom).

to the shot, Matte World Digital repainted the sky with a sunset, and added fires, torches, troops, and firelight on the buildings.

The Battle

Before dawn on March 6, waves of Santa Anna’s troops began attacking the Alamo. At Matte World Digital, several artists in the studio worked on shots for the sequence—some taking shots early in the battle, others the later shots—replicating troops, adding gunfire and flares. One far background was painted by Chris Evans, another was painted by Scott Brisbane. For fallen soldiers in the foreground, the crew added photographs of themselves wearing Mexican uniforms.

Compositing was handled by Todd R. Smith, technical artist, who used Eyeon Software’s Digital Fusion to manage particles, paintings, and three layers of smoke. “You’ve got to have at least three CG smoke layers moving at different speeds to get a nice shift in perspective,” says Barron. “Two are not enough. Your mind can absorb two, not three, so the complexity of three makes the scene look real.”

The last shot in the sequence is a so-called “God’s-eye view” of the battle. To plan the shot, Cotter built a 3D model of the Alamo from architectural plans and used it to position the camera. Then he put a CG camera on a terrain map that matched the location where the film would be shot, to visualize the view with different lenses and from various heights. “When we were on location, we knew exactly where to put the crane, how high it would be, and

To heighten emotion outside the Alamo while Davy Crockett plays his fiddle inside, Digital Matte World artists enhanced the original shot (top) by adding troops in the city beyond and a more dramatic sunset (bottom).



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what lens to use,” says Cotter. “I took a snapshot when we were all set up, and it looked exactly like the previz.”

With the camera on the crane locked off, the Matte World Digital crew took five shots with the extras charging the Alamo in various places and one of the extras fighting inside. The shots would later be spliced together into a composite image. “The elements had to be historically accurate,” says Rivera. “If there were too many troops on the southeast wall, we had to remove some. Fortunately, the elements were shot correctly, so we barely did any roto.” During the battle, flares illuminate the battlefield. The flares and the fires were shot against an unlit background and added to the plate; lighting was adjusted beneath as the flares soared over the Alamo.

Because the cast on location used black powder, there was smoke in the plate—sometimes too much or not enough—so Rivera had to remove dense smoke in some areas, but add it to others. Also, he added gunfire, working in Adobe’s After Effects to animate the individual elements. When finished, the crew had created an animated painting of a battle that looked completely realistic.

Virtual Worlds

In one shot, looking out from the Alamo toward San Antonio, where the Mexican troops were beginning to encircle the fort, the camera begins with a close-up of Lieutenant Colonel Travis in the fort and then circles around the fort to end up back at the beginning. For this, Matte World Digital created a cyclorama from moving footage. “The technique was similar to the one we used for the parade scene, but far more complex,” says Cotter.

First, the crew created a previzualization to predict camera angles. As they shot sections of the real scene, they began stitch-



The Alamo set, built on a ranch outside Austin (top), was transformed into a fiery battle by Matte World Digital artists, who spliced together slices of action photographed with a locked-off camera and composited the images into the final scene (bottom).

ing the shots together until they had mapped a reproduction of the scene inside a sphere. The motion of the original steadicam footage was used to drive the virtual world, so the shot could move from the real (the close-up at the start), to the virtual, and then back to the real at the beginning. Smith added troops to the virtual world, altered some of the buildings, and managed the compositing for the shot.

Putting the complete world for the 360-degree shot into the computer took a terabyte of data, but it was worth it.

“Our virtual-camera technique gave the director a way to achieve the shot he wanted without dealing with the almost impossible logistics and expense of having thousands of real troops standing around in 90-degree heat all day,” says Barron. “When we pan from the real world and enter our virtual world, we have complete control. We can add as many troops as we want and even change the background hills that are covered with those troops to bring them closer to the camera for dramatic effect.”

For some films, visual effects allow directors to create fantasy worlds. For this film, that control allowed the filmmakers to tell a legend in a way that hadn’t been done before. ■

Barbara Robertson is a contributing editor for Computer Graphics World and a freelance journalist specializing in computer graphics, visual effects, and animation. She can be reached at BarbaraRR@comcast.net.

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Beautiful People

A filmmaker creates
a pair of "perfect"
digital actors with
features borrowed
from Hollywood
stars

By Jenny Donelan

Beauty may be in the eye of the beholder, but it would be a mistake to assume that our notions of human beauty are completely subjective. Though exceptions exist, people tend to agree about who's attractive. Hundreds of thousands of Web hits each year, for example, demonstrate that there's something special about tennis player Anna Kournikova—and it's probably not her backhand. What is it about certain individuals that makes our hearts go pitter-pat? In a word, it's symmetry. According to recent studies on the subject of human attractiveness, those people whose faces (and bodies) are the most symmetrical are the ones we find most desirable.

A chance conversation with actor Marlon Brando several years ago introduced veteran CG filmmaker Scott Billups to the idea of symmetry as beauty, and started him on the road to his current Faces project: a digital couple whose features are modeled from those of Hollywood's most attractive stars. Each character has a particular actor's nose, another's chin, another's eyes, and so on. Using digital tools, Billups morphed together these features as symmetrically as possible. The resulting CG man and woman look somehow familiar, yet not really identifiable. These designed-for-appeal digital characters not only resemble Hollywood stars, they're poised to become stars in their own right, as Billups plans for them to take on their first acting roles later this year.

The Fibonacci Sequence

Billups has been creating virtual effects for film and broadcast for nearly 20 years. His credits range from previsualizations for *Jurassic Park* to digital soccer players for the recent *Bend it Like Beckham*. He's also a prolific creator of synthetic characters, having crafted more than 200 of them, including a digital Marlon Brando

If "the Vitruvian Woman" looks vaguely familiar, it's because she's a digital composite of features from several popular actresses.



All images courtesy Scott Billups ©2004

in 1990 and a CG Marilyn Monroe in 1994. It was while discussing Monroe with Brando, who had known her personally, that Billups began thinking about symmetry and beauty, and also hit upon an apparent contradiction.

"As we got into the actual features of Marilyn, we found that she was really odd," says Billups. "She had a little clown kind of bulbous nose, and her ears were enormous—they were a quarter the size of her head. She was very disproportionate." If symmetry equals loveliness, "how did this woman become a sex goddess, the icon of beauty?" According to Brando, this was because she was "a master of illusion," says Billups. Through makeup and other artifices, she could create the illusion of symmetry.

In the course of these conversations, Billups also learned about the Fibonacci numbers, a mathematical sequence (1-1-2-3-5-8-13...) introduced by 12th-century mathematician Leonardo Pisano Fibonacci. This sequence, in which each number is the sum of the two preceding numbers, appears in many different areas of mathematics, science, and nature. It even has its own journal, *The Fibonacci Quarterly*.

Most important for Billups's purposes, the Fibonacci sequence relates to the number 1.618, also called the Golden Mean, or *phi*. If you take the ratio of two successive numbers in Fibonacci's sequence and divide each by the one before it ($1/1 = 1$, $2/1 = 2$, $3/2 = 1.5$, $5/3 = 1.666...$), the ratios eventually settle out at 1 to 1.618. (For more information about the Fibonacci sequence and how it relates to the Golden Mean, check out www.mcs.surrey.ac.uk/Personal/R.Knott/Fibonacci/fib.html.)

Numerous examples in flora and fauna demonstrate the naturally occurring dimensional properties of the ratio 1.618-to-1. These include the distances between the spirals of a Nautilus shell, the arrangement of seeds in a sunflower, and the features of the human face. All faces adhere to this ratio, but the ones that do so most precisely are the ones we generally perceive to be most beautiful.

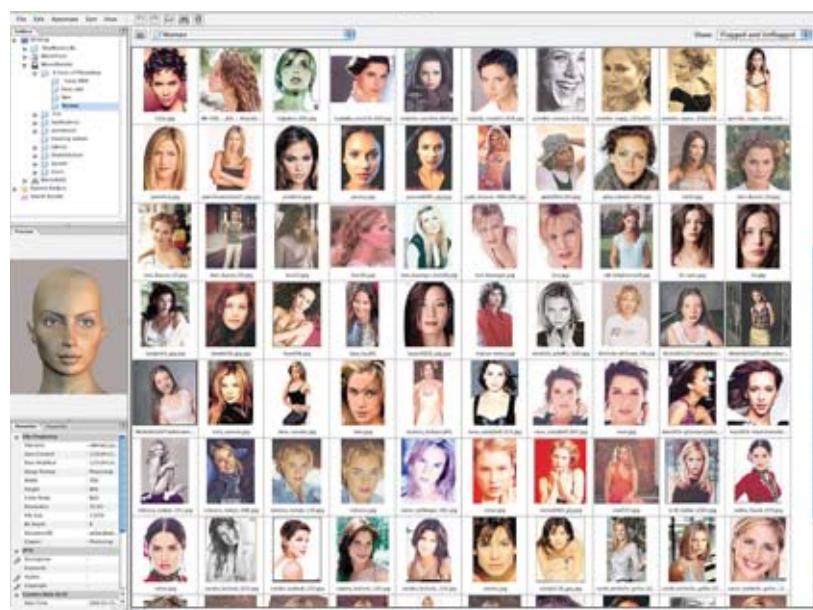
Famous Features

At the time of the Marilyn Monroe project, Billups hit on the idea of investigating the symmetry of beautiful faces, and representing them digitally. But the tools for a project of this kind did not exist in the mid-'90s. Less than a decade later, another chance conversation with some fellow Hollywood directors, and the realization that the proper tools were now available, spurred Billups to create what he's dubbed The Vitruvian Couple (after Leonardo da Vinci's famous drawing, *The Vitruvian Man*, which demonstrates that the length of a man's outspread arms is equal to his height).

Billups began with an informal poll

own chin more than 100 times. At the height of the project, which went on for eight months, Billups was spending up to two hours per day going through emails related to the Faces project.

Billups started out charting the data on a spreadsheet in Microsoft Excel, then moved it to Adobe's Photoshop CS. The file browser features in the latest version of CS amount to what Billups refers to as "visual Excel." The browser allows users to view images in rows and columns of large-format thumbnails that can be scaled up to larger sizes if need be. Images are also editable with regard to file size, history, category, and so forth, all within the



Photoshop CS's file browser allowed Billups to view files as sizable images, not just as file names, and also to sort and edit images, using the dialog boxes to the left.

among Hollywood directors. He created a Web page and a designated email address for the project, letting it be known that he was taking votes for the most beautiful features—not the most beautiful actors and actresses, but the most beautiful lips, noses, cheekbones, etc. belonging to actors and actresses. Billups reasoned that because directors spent so much time behind the camera, they, more than anyone, would have informed opinions about his subject.

Then he asked actors and actresses to participate in the voting process as well. Many voted for themselves, he notes, with one very famous individual voting for his

browser, where they can also be grouped into categories and subcategories. "I basically built sub-bins of body parts," says Billups. "It was a little Frankensteinian."

These groupings allowed easy views of the features that were leading the pack—until a new set of votes would come in. "The leaders shifted quite often," he says.

Votes are still trickling in, but early this year Billups decided to tally the results and set about creating his ideal man and woman. Here again, the new Photoshop CS came in handy. "The texture map for the faces was huge—8000 pixels high by 12,000 pixels wide, with maybe 20 layers." With Photoshop and a dual-processor Ap-

ple G5 with 8GB of RAM, however, the files “just rolled around like nothing.”

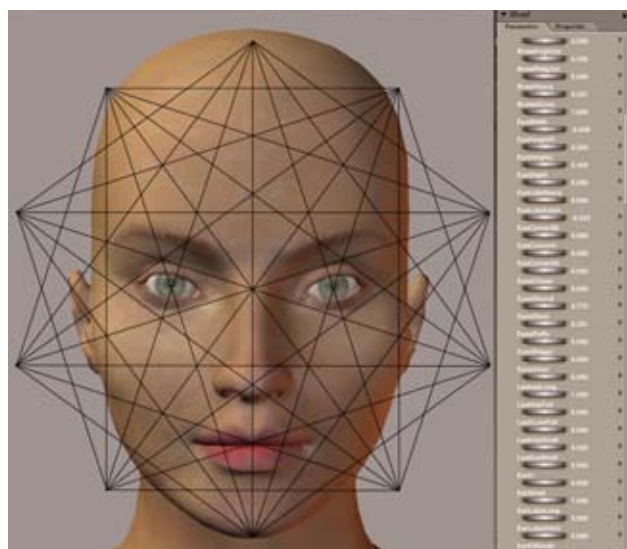
As he assembled the faces in Photoshop, Billups used a grid of two pentagrams (yet another manifestation of the Fibonacci sequence and the Golden Mean), one rotated over the other by 180 degrees. The resulting 10-pointed star contained intersecting lines that helped determine placement and relative distances between features.

The artist also relied on orthogonal photographs of the thespians in question. Here he discovered that Marilyn Monroe was not the only master of illusion in Tinseltown. “Most actors and actresses have a somewhat unflattering set of shots on file for makeup artists, prosthetics, and whatnot,” he says. “You look at ‘insert name of famous actress here’ with makeup on standing on the red carpet, and then you look at the orthographic picture, and you say, ‘Oh my goodness, it’s not the same person.’”

Billups used Photoshop CS to work with skin tones across multiple layers, and employed the software’s Healing Brush tool to

blend between regions such as the eyes and cheeks. From Photoshop, the files went into Alias’s Maya for 3D modeling, and then into Curious Labs’ Poser, which Billups used for the majority of the project.

The nearly complete models are now being animated in NewTek’s LightWave. Billups is using motion capture, which he prefers to other types of animation. “I’m not big on kinematics or physical driving. The people best qualified to articulate



A near-final version of the “perfect” man, complete with modern hair, is shown at top. An overlay of pentagrams helped Billups symmetrically position facial features on the woman’s face above.

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synthetic characters are computer operators. But are they the best people to evoke a sense of the dramatic? No. Mocap is the way you do that.”

So who are the Vitruvian Man and Woman modeled after? Who has the most beautiful eyes, ears, chin, etc. in the business? Unfortunately, for legal

reasons, that’s a secret for now. However, two of the winners are so obvious, says Billups, that he thought he may as well divulge them: The Vitruvian Man has Brendan Fraser’s mouth, and the Vitruvian Woman, Michelle Pfeiffer’s mouth. Brooke Shields was the top vote-getter overall, but not a winner in any single feature category.

Perfect Actors

Billups plans for the couple to debut in his own short film, “Mid Century,” which is due out later this year. The 30-minute movie is shot in high definition and stars Faye Dunaway and John Glover. “I’m going to try out the characters there, and I figure nobody can give me any grief for that.” Afterward, the CG duo will make the circuit in Hollywood, “and if people ask me to put them in their movies, we’ll see.”

The “grief” Billups refers to is some consternation in the entertainment world over digital actors—with or without borrowed features—who are viewed as possible threats to the living, breathing variety. Digital movie stars wouldn’t, for example, demand high wages, air-conditioned trailers, or imported water.

Billups claims that these fears are unfounded. In some cases—such as stunts—it’s true that digital actors are being used in place of real people. But in general, he says, “it’s always going to be cheaper to feed ‘em [live actors].”

For example, Billups explains that it’s easier and far less expensive to direct and film a live human walking through a doorway and stepping over a box than it is to have the same action performed in a motion-capture studio with specialized technicians operating the equipment. The resulting mocap data would then have to be resolved, rendered, composited, and so forth by ever more specialized artists and technicians.

At the end of the day, are Billups’s digital man and woman the most beautiful individuals ever? Symmetry or no, the answer still seems to be in the eye of the beholder. A casual survey of the *Computer Graphics World* staff showed mixed results. Some thought the characters stunning. Others shrugged. Of course, it’s not fair to compare digital characters or still imagery of any kind to living humans. After all, there’s more to beauty than a 1.618-to-1 ratio—and Billups himself agrees with that. “True beauty,” he says, “comes from the actions and the play of emotions across the face.” So, until we find the mathematical ratios for those, we’ll just have to rely on our instincts. ■■

Jenny Donelan is a contributing editor for Computer Graphics World.

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By Courtney E. Howard

iven the wealth of entertainment options available to us, our time and attention are divided amongst television, digital video recorders, DVD players, computer and console games, camera-equipped and video-capable mobile phones, and the World Wide Web. Despite all of these media and communication devices, or perhaps because of them, we as consumers are difficult to reach—at least from a marketing standpoint. Yet, one recent marketing innovation is impossible to ignore. Virtually all TV viewers have seen one of the many eye-catching, CG-based TV ads that end with a Web address. They compel us to visit the associated Web site, where we become privy to even more eye-catching CG elements. This combination of TV commercial and

on-line games is the hottest marketing trend today, and a growing number of vendors are jumping on board. Arguably the leading pioneer in interactive advertising, sports apparel manufacturer Nike harnessed the power of CG and the Internet with spectacular results.

As part of a successful and synergistic marketing project, Nike turned heads with its CG commercial, “Gamebreakers.” An awe-inspiring spot featuring NFL stars Michael Vick and Terrell Owens, “Gamebreakers” was shot in CGI by renowned director David Fincher and his production company, Anonymous Content. Fincher, together with director of photography Claudio Miranda, employed a Grass Valley Viper FilmStream digital cinematography camera to capture the action. Done almost

completely in CG, the commercial boasts visual effects—including 46 CG football players, a CG field and stadium, CG fans in the stands, snow, breath, and atmospheric elements—created by CG feature-film powerhouse Digital Domain. Whereas a motion library was used for character animation in 75 percent of the commercial, the remainder was animated by hand.

“The commercial itself looks like a video game, and that was the intended effect,” says David Madden, executive vice president of WildTangent. “If you go out on the street and do a poll, people who don’t play games will say, ‘Hey, that’s a really cool commercial of a video game.’ People who do play games will say, ‘I wish Madden Football or Sega Football could be like that.’ It’s just so over-the-top, and that



Images courtesy Nike.

Nike's "Gamebreakers" commercial and those responsible for the eye-catching spot, including director David Fincher, have received awards and accolades. More important, however, the innovative commercial quickly grabbed viewers' attention and prompted them to continue the video game-based fun on-line at www.Nikegridiron.com.

was Nike's intended effect: to create some real buzz with it. And it does just that."

The fast-paced, CG-intensive spot, which ends with the Nikegridiron.com Web address, proved effective in garnering the attention of viewers. In fact, the TV commercial drove more than one million visitors to Nikegridiron.com, where they gained access to a set of video games made for Nike by WildTangent.

WildTangent worked in tandem with Nike and R/GA, the New York-based interactive agency that created the Nikegridiron.com site. R/GA's producers, in turn, collaborated with Wieden + Kennedy, the agency responsible for the TV creative. "The commercial and the games are very synergistic," says Madden. "The games have a classic, arcade style and, although

they are not of the same production value as the commercial, they sync up well with the TV campaign. Nikegridiron.com is a prime example of what can be done with games that are custom-published for a particular vendor."

Custom Made

WildTangent's Custom Publishing Group, headed by director David Selle, created all seven of the mini-games on Nikegridiron.com. Whereas the studio typically prefers between four and six months to produce and release a game tied to a campaign, the Nike project was done under extreme time pressure. "The first on-line

game was delivered about six weeks after we signed," recalls Selle. "The other on-line games were released in one- to two-week intervals after that. It was an incredibly fluid development process. The calendar time of actual development was roughly four months, from scratching your head to having everything done for all seven games. That gives you an idea of the intensity that the Nike project entailed."

In order to meet the deadline, the project required parallel development on several of the mini-games. "Sharing elements between games was absolutely essential given the timeline," says Selle. "We had to be able to reuse stuff." The seven games

share the same playing field, and the animated players were reused extensively. All character models were developed in stair-step parallel, whereby WildTangent would begin working on one before its staff was finished with the previous one. Selle's team changed the geometry or scaled models to accommodate a wide-receiver versus a fullback build, for example. The same process

was used to create the star athletes: WildTangent started with the same skeleton and tweaked it to represent each player. "We'd take the Michael Vick model, pull the vertices around, shrink it or make it a little taller, and use it for the other players."

Low-Poly Likenesses

Each of the seven games incorporates the likeness of a famous athlete and a shoe and Pro Compression gear from Nike's elite sportswear line—created by WildTangent with the use of Nike marketing materials. "We took those likenesses and projected them," says Selle. "We built a 3D model in Discreet's 3ds max and Character Studio. Nike provided digital photos from the marketing shoots they had done for this campaign, and we used the information to model the seven athletes who were the centerpieces of the games." Nike also provided source code for the apparel—a variety of long-sleeve, short-sleeve, and tank-top versions of the Nike tops, as well as shoes—that the characters needed to wear.

"For on-line games, we have to model in very low poly so they can work in real time," notes Selle. "When you show a player model to, say, an athlete for approval, he or she typically says, 'Wow, that's not what I look like.' But we have to do it that way; we're shooting at computers that may be three years old, so we have to balance that performance. Optimizing our geometry and textures to address a performance-limit architecture is a specialized art form at which game companies in general are very good."

After the character models were approved, Selle's team put them into the game environments. Having built the Michael Vick game from start to finish, WildTangent used it to begin at least three of the other games in parallel development. At the height of production, when four or five of the games were being produced at the same time, WildTangent had 12 people—including artists and programmers—working on it full time. WildTangent's proprietary Web Driver 3D plug-in powers the game engine. The production group used Adobe's Photoshop to create game-screen elements and textures, as well as the Microsoft Office Suite for project planning, design, and tracking. Microsoft's



Just as Michael Vick was the cornerstone of Nike's "Gamebreakers" commercial, he is the star of an on-line game called *Blazing Speed*, one of seven developed for Nikegridiron.com by WildTangent.

Visual Studio .Net Visual J++ environment was employed to develop the games, whereas NXN Software's Alienbrain enabled version control through asset management.

Technology Touchdown

Nike's investment in the CG commercial and custom-published games is paying off, in spades. For his work on the project, director David Fincher won an award for Outstanding Directorial Achievement in Commercials for 2003 from the Director's Guild of America, as well as a nomination by the Visual Effects Society for Outstanding Visual Effects in a Commercial. Not only has the spot received both awards and nominations, but also the Nikegridiron.com site has attracted slews of consumers.

"Nike was extremely pleased with the results of this campaign overall," says Selle, "and we exceeded projections in nearly every category. The most loyal players have played the mini-games more than 2000 times, as evidenced by the leader boards on the site. And these are two-minute games. If you add it all up, that's 4000 minutes, or more than 66 hours, of brand exposure for Nike to a prime and hard-to-reach demographic."

Successful, custom-made campaigns such as Nike's are capturing the attention of various enterprises, indicating that this is just the

beginning of customized games (see "Customized Content," pg. 48). In fact, WildTangent's Madden expects the market to explode. "Given how consumers spend their time today, you're going to see a lot more product placement in games," he says. "You'll even see products in retail titles, such

as those from EA and Activision. And you're going to see a rapid influx of custom-published games. Advertisers are likely to say, 'I want to make an interactive commercial that's so compelling, so rich, and so powerful that people come to the Web site again and again, talk about it, and invite their friends.' After seeing this," he contends, "they're likely to say 'I want to be like Nike.'" ■■

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

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Clockwise from left:

Grand Prize "On the Edge of Time" by industrial designer Jari Saarinen of Finland captivates viewers with its implied motion. This dynamic image was modeled in Rhinoceros, and then imported into 3ds max, where the final scene was created and rendered. Final compositing was completed in Photoshop, where the artist combined several rendered layers and tweaked the colors.

First Runner-up "Taming the Bugbears" by Liu Wei of China commands attention with the model's flowing, transparent antennae, produced with a layered shader function within Maya. The artist modeled the main extensions by hand and turned them into soft bodies, then created the remaining ones using a MEL script.

Honorable Mention (HM) "Dreamily" by professional artist Udom Ruangpaisitporn of Thailand incorporates shapes and textures commonly found in nature and in Thai fine arts for a 3D surreal Oriental look. The image was created in 3ds max and Photoshop.

The current generation of hardware and digital content creation software is allowing today's artists to create imagery that is out of this world. To illustrate this point, Alienware, maker of high-performance computer systems, and graphics art portal CGNetworks hosted a 3D contest for which artists submitted original images of mysterious alien locations. Approximately 1550 people entered, submitting a total of 3873 pieces ranging from science fiction to abstract to fantasy.

Industrial designer Jari Saarinen of Finland was awarded the grand prize for "On the Edge of Time," which consists of several hundred boxes that were modeled and placed individually into the scene. According to



the judges, "It was dynamic with movement, thereby creating an experience in which you can see the motion and hear the surface crackling." Liu Wei of China received first runner-up honors for "Bugbears," which has numerous light sources. "It has a strong color scheme and composition that adds to its sense of depth," note the judges. Monsit Jangariyawong of Thailand was second runner-up with "Alien Gate," an image judges say "contains good composition and a sense of depth and movement."

Several winning images are featured on these two pages. All those garnering awards can be viewed on the Alienware Web site at www.alienware.com/CGChallenge. —Karen Moltenbrey

Clockwise from left:

Second Runner-up "Alien Gate" by professional 3D artist Monsit Jangariyawong of Thailand contains an organic look, achieved with Wings 3D, in addition to Maya.

HM This image by Christophe Baliko of Belgium incorporates color and altered gravity into this organic scene, generated with a range of tools, including LightWave.

HM "Submerged Ballet" by Web artist James Kaufeldt of Sweden portrays an alien look, which he produced with Cinema 4D.

HM "Hidden Paradise" by Brett Keyes of Canada obtains its unique look from particles, created in Maya and Houdini, and then converted into polygonal geometry.

HM This image by Jussi Saarela of Finland has an ice-like look made in 3ds max and Brazil.

HM "Mnemonia" by artist Chris Koutroulos of Greece, which hints at the former existence of an unknown presence, was created using Maya and Mental Ray with Final Gather.

FireGL X2-256t

ATI unveils an impressive and powerful graphics accelerator

By George Maestri

ATI has been producing the FireGL line of OpenGL graphics cards for quite some time. Starting with Diamond, and then continuing with ATI after a merger, the FireGL cards always have been solid performers. You can find them configured in high-end workstations from most of the major systems vendors. The FireGL X2 series of cards is the newest in the line and is incredibly fast. The cards are also reasonably priced, setting a new standard for price and performance in the high-end workstation market.

The FireGL line of cards has gone through several incarnations and different chipsets. The FireGL X2-256t is powered by the FGL 9800 Visual Processing Unit, the big brother of the chip that powers ATI's FireGL X1. Developed by ATI, the FGL chips are custom-made with four geometry engines and eight separate pipelines for pixel processing. The FireGL X2 has 256MB of DDR video memory with a 256-bit data path, which should provide plenty of room for geometry and textures.

Modestly sized, the FireGL X2-256t card shares a layout similar to ATI's popular Radeon cards. Because its back end extends only about three inches past the AGP slot, it should fit into almost any case. On the back of the card is a Molex connector to get extra power from the system's power supply. A massive heatsink with

plastic ducting dominates the center of the card. While the fan is huge, it is thin enough that the FireGL does not require that the neighboring PCI slot be empty.

Regardless, it's a good idea to keep this slot open, as the card needs lots of cooling. Like most high-end cards these days, this accelerator supports dual monitors. The back of the card is equipped with two DVI connectors, which can be used with analog monitors through the supplied adaptor.

The card is supported under Windows and Linux, but not Mac OS X. I tested it on a machine running Windows XP, and installation was easy. (Also supported are OpenGL and DirectX 9.) The Windows drivers provide a robust control panel that enables you to tweak just about every parameter of the card. Included with the software are drivers for Discreet's 3ds max, providing an extra performance boost.

Dual-display mode is configured with the use of the control panel. Once configured, ATI's Hydravision utility enables you to manage the placement of application dialogues between the displays. Hydravision also provides control over such features as window transparency. Display resolution tops out at 2048x1536 per display, which should drive most large monitors. It's still not quite large enough

to drive the ultra high-end, 9-megapixel displays, but that's still a small market segment. One nice thing about the card is that it supports 24-bit-per-pixel color, which means that you can display more than 16.7 million colors on your monitor. For people working in motion pictures or with



The ATI FireGL X2-256t is a high-performance graphics card offered at an affordable price point.

other high-resolution images, this feature should be incredibly helpful.

I benchmarked the card using Viewperf 7, the standard test for OpenGL-based cards. The results were excellent, with the FireGL X2-256t offering a 3ds max score of 24.26, a 34.53 in Pro/E, and a UGS score of 38.56. These figures were roughly 10 percent lower than those published on the ATI Web site. Because I did not do any optimizations on my system, my results should be considered typical for most users. My results put the FireGL X2-256t only slightly behind the nVidia Quadro FX 2000 in terms of performance. Considering the ATI card costs several hundred dollars less, the FireGL X2 offers an excellent price/performance ratio.

Of course, benchmarks are a rather synthetic way to test a card. I used the card for several days on a 3ds max project I was developing, and had no problems in either OpenGL or DirectX mode. The FireGL card helped me with some compositing in Adobe's After Effects and Photoshop. Again, these applications presented no discernable issues.

I really enjoyed the FireGL X2 card, and found it to be very stable. Most important, it is perhaps one of the fastest cards on the market today, and it's certainly the fastest sub-\$1000 card available. Offering users a great bang for their buck, the FireGL X2-256t would be an excellent addition to any 3D workstation. ■

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

FireGL X2-256t

stats

Price: \$899

Minimum System Requirements:

Intel Pentium 3, Pentium 4, Xeon AMD Athlon XP/MP/Opteron or compatible, 128MB of system memory (256MB or more for best performance), a motherboard with a free AGP slot and correct AGP chipset driver, a CD-ROM drive, and Windows 2000 with Service Pack 1 (or higher), Windows XP, or Linux XFree86 4.X.0.

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Dell Precision 650

Dell targets video and 3D markets with a robust, high-end workstation

By Dariush Derakhshani

Dell computers have long been dependable solutions for home and office computing. But in the world of high-end workstation hardware, Dell is not the first name that springs to mind. To remedy that, Dell's new line of Precision PCs targets the high-end user. The Precision 650 incorporates top-class components into a PC billed as a digital media workhorse. A decked-out Precision 650 can be an all-around answer to a studio that needs highly functional and adaptive systems to carry out a wide range of demanding chores.

I asked Dell to customize a Precision 650 to fit a budget of \$6000, including a high-end display. Built around dual Intel Xeon Pentium 4 CPUs, this Dell housed a 120GB 7200 RPM hard drive, DVD + RW and DVD drives, and 2GB of high-quality DDR RAM, as well as an Nvidia Quadro FX 1000 graphics card. And it packs a heck of a punch.

Sitting pretty at my desk, the Precision 650 handles all sorts of media content creation. 3D applications, such as Alias's Maya and Discreet's 3ds max, ran smoothly with the Quadro FX card. As a matter of fact, Maya 5 ran on dual screens at 1600x1200 resolution per screen without a hitch, and Adobe's Premiere Pro ran like a champ across both monitors for video editing. I was very pleased to see those applications and all my other content creation applications, such as Photoshop and After Effects, run with stability and fantastic performance. This is no doubt due to the hefty specs of the machine, notably the dual Xeons and 2GB of memory, which are

key for such a system.

The system effortlessly multi-tasked Maya 5, After Effects 6, Photoshop 7, and Premiere Pro, all without stopping my train of thought once. It is frustrating to close and launch applications or move to another machine entirely to integrate and visualize your work. Using a single system made for such a great work flow that I transferred a valuable personal project from my meticulously built workstation tower to the Dell by installing the drives into the Dell's case.

The case is well constructed and expandable to accept additional 3.5-inch drives and a 5.25-inch drive, which I used for a removable drive rack—useful for media work. A slightly larger and more accessible case with more open bays and a reset switch up front would have been nice, although most people will never need to enter or expand the system. Dell prefers to build the workstation to your exact specs, so check with them and your warranty before you open the system yourself. Regardless, the Dell worked well with the two drives I installed. It also can easily expand with its multiple FireWire and USB 2.0 ports.

One of the Precision's greatest features is its case. It's easy to open, fairly accessible, sturdy, and amazingly quiet, especially for a monster workstation. With most workstations being as loud as they are, you'd expect the measure of a PC's power to be proportional to how loud it gets, but not so with the 650. Windows XP booted in a blink, media files loaded fast, application windows snapped open, and 3D rendered in the background without slowing. All this amounts to one classy, well-integrated machine.



Forget what you thought you knew about Dell, makers of workstations targeted at high-end users.

And if something goes wrong, support has to be there when you need it. Dell provides a separate support number for workstation clients—a relief because regular support can wear out your patience. Twice I manufactured issues on my system at ungodly hours and was met with fast and accurate support, but only if I called the workstation support team directly.

Still, I figured something would eventually crash the Dell or slow it down, but in the several weeks I've had the machine running 24/7, it hasn't lost its edge and needed to reboot only a few times—a remarkable feat when you consider what I put this system through.

The display, an UltraSharp 2000FP, is a 20-inch flat panel capable of 1600x1200 native resolution. It boasts picture-in-picture, multiple input ports, excellent color saturation, and crisp graphics with minimal motion ghosting typical of LCDs.

If you're like me, you need a powerful, stable, and integrated workstation that can take a serious beating without flinching. It has to import DV, run 3D, render memory-hungry scenes, edit video, and burn DVDs—everything to take a project from script to DVD, as well as play some games, if you can find the time to relax. Highly configurable and well supported, the Dell Precision 650 is worth its premium for a demanding user or studio. #

Dariush Derakhshani is an effects animator with Sight Effects in Venice, CA, and author of several books. He can be contacted at dd@koosh3d.com.

Precision 650

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Price: \$6000 as configured

Minimum System Requirements:
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Liquid Edition 5.5

Pinnacle launches a fluid NLE

By David Singer

You tend to expect a great deal from a company that has won nine Emmy Awards. With Liquid Edition 5.5, Pinnacle Systems delivers. The company put a great deal of thought into this editing system, and it shows—from its power and flexibility to its highly detailed manuals. There's not only a lot that's new, but also a lot to like about Liquid Edition.

For starters, Liquid Edition is customizable and designed to enable video editors to work the way they want. While many NLEs allow for the customization of keyboard shortcuts, Liquid Edition takes it a bit further, with the ability to personalize the interface and editing style.

When you first launch Liquid Edition, you'll be presented with the default setup, already configured for your resolution. Because editors have their own styles, it permits them to customize their working interface. If any buttons that you don't use frequently are on the toolbar, you can simply drag and drop them back into the Function Library and, by the same token, reverse the process to add buttons used more regularly. It's no more difficult than right-clicking the toolbar and selecting customize. Additionally, users can choose between single track or A/B styles and overwrite or film-style editing.

In professional studios, you frequently find multiple people working together on a single project, and even the same workstation. Here, Liquid Edition really shines. Users can save their individual work space

customizations or profile. As a result, they can sit at a shared workstation and immediately begin working in their own style, regardless of who most recently worked in Liquid Edition.

Version 5.5 offers seamless interoperability with other products and support for networked drives. By supporting networked drives, multiple users can share resources as well as play back from and render to the same drives. And with the X-Send feature, users are able to share resources with Pinnacle's Commotion Pro, Macromedia's Flash, and Adobe's After Effects.

Liquid Edition is all about working better, faster, and smarter—and it shows. Its Instant Save feature constantly saves your progress in the background. A history palette function (similar to that found in imaging programs) makes reverting to an earlier point a simple matter. With features such as real-time compositing, support for up to 10 streams with real-time effects and background processing, automatic scene detection, and a full-screen preview, you can spend more time on what matters most, the creation process, and less time worrying whether your NLE can keep up with you.

With Liquid Edition, you no longer have to spend time rendering your project and opening a separate application to author to DVD. DVD authoring can be performed directly from the timeline.

While in Liquid Edition, and with your project on the timeline, click DVD Menu Wizard on the toolbar and you'll be walked step-by-step through the DVD-creation process. You can use a supplied template or make your own. Users save time by creating menus and chapter

points, testing a DVD "build," and then burning to DVD within Liquid Edition.

With Liquid Edition 5.5, Pinnacle had hoped to provide users with a powerful non-linear editor beneath a simple interface. By combining Edition and Liquid Purple, they have succeeded—with one caveat. If you're considering moving to Liquid Edition from another NLE, such as Adobe's Premiere Pro or an Avid system, expect a learning curve. The structure of Liquid Edition is significantly different from other NLEs and so, does not lend itself to a simple NLE changeover. It is wise to continue using your current NLE during the transition, until you reach a comfort level with Liquid Edition.

Pinnacle's Liquid Edition was put to the test on two different workstations and a laptop, all running Windows XP and equipped with Pentium 4 processors (2.26GHz and higher) and RAM ranging from 512MB of DDR memory to 768MB of PC800 RDRAM. Liquid Edition proved to be stable and ran smoothly on each platform. Through each test, it performed admirably without requiring any massaging to make things work. With all the features Liquid Edition offers video editors—such as CX Color Correction, RS-422 Machine Control, Jog/Shuttle Control support, DVCPRO25 support (natively), and too many more to list—Pinnacle has hit a home run with this NLE. ■■

David Singer (*singercreativeservices@charter.net*) is a founding partner of Singer Creative Services offering digital photographic, video, and other services.



Liquid Edition 5.5 enables users to customize the interface, streamlining work flow and saving time.

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www.pinnacle.sys.com
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SOFTWARE

PLUG-IN

Import and Export

Win Digimation is shipping GestureMax 1.0 for Versions 5.1 and 6 of Discreet's 3ds max. A new plug-in, GestureMax provides users the ability to import into the 3ds max work space Curious Labs' Poser models with optional skeletons, skinning, and rigging applied. Digimation's new file-import plug-in is capable of moving Poser actors, figures, props, and associated textures and morphs as Poser .PZ3 files to 3ds max. GestureMax 1.0 requires Poser 4 or 5 and is priced at \$295.

Digimation; www.digimation.com

infoNOW 128

SHADING

ATI Upgrade

Win ATI Technologies has upgraded its RenderMonkey hardware-independent shader development tool to Version 1.5. The new edition adds full support for the OpenGL Shading Language, helping users create realistic games and animations, regardless of their hardware. RenderMonkey 1.5 also



enables the importation and exportation of stand-alone packaged effects files. The new RenderMonkey SDK assists developers in customizing the RenderMonkey environment. An updated Microsoft FX exporter

and support for procedural geometry and textures rounds out Version 1.5. The upgrade to RenderMonkey 1.5 is available as a free download via ATI's Web site.

ATI Technologies; www.ati.com

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HARDWARE

STORAGE

REV Up Data Storage

Iomega has unveiled its latest storage solution, the REV 35GB/90GB drive. Designed to offer hard-drive performance in a removable disk, the Iomega REV serves a variety of uses, including server and desktop backup, file sharing, and archiving. Roughly the size of a deck of playing cards, REV removable disks can be rewritten more than 1 million times



and boast a maximum sustained transfer rate of 25MB/second. Video and graphics professionals, and others working with large file sizes, benefit from the REV's high storage capacity and fast data-transfer rates. The Iomega REV drive is available in two configurations: USB 2.0 external, priced at \$399.99 with a single disk, and ATAPI internal for \$379.99 with one disk.

Iomega; www.iomega.com

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VIDEO

MaxPac X

MaxVision has introduced its family of MaxPac X Class computers, said to be the indus-



try's first triple-LCD portable family of computers designed for such applications as SD and HD video. Designed to be rugged and portable, the MaxPac X Class computers combine three 19-inch, folding displays, which are driven independently by the Matrox Parhelia, with dual Xeon processors and seven hard drives in a small form factor. The new NLE computer also incorporates integrated Bluetooth, Gigabit Ethernet, and a dual-media DVD burner. Computers in the MaxPac X Class product line range in price from \$11,000 with a single display to \$28,000 for a system with multiple displays, processors, and drives.

MaxVision; www.maxvision.com

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events

JULY

12-15

Macworld Conference & Expo Boston 2004, held in Boston.

Contact 508-743-0107, www.macworldexpo.com.

AUGUST

8-12

SIGGRAPH 2004, held in Los Angeles. Contact www.siggraph.org.

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2004 Oregon3D Film Camp, held in Portland, Oregon. Contact Oregon3D at 866-626-9100, www.oregon3d.com/filmcamp.html.



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infoNOW 21

Continued from page 48

events. The game is on the disk, but then it actually hooks in right to the Web site where all the on-line characteristics are as well. Many of the games can be played on-line or downloaded to the user's machine.

Q *Could you describe the process of creating a customized game? How much time does it usually entail?*

A The entire process typically takes anywhere from four to six months to produce and release a game tied to a larger advertising campaign. It's best to work in tandem with the agency responsible for the TV creative and the print creative, to ensure that they all sync up nicely and are tied to events and bigger themes. Then it's a matter of going into a typical video game cycle, but compressed.

Q *Is the trend of marketing with games growing?*

A Advertising in the US is a \$260 billion industry overall on an annual basis. The Internet is expected to receive about \$6.5 billion of that in 2004. That's a lot of money essentially going to banners, buttons, and Macromedia Flash content. The video game market in the US is roughly \$7 billion. Custom-published games are at the intersection of Internet and gaming. Time spent on video games is huge, and dollars of advertising against that time span is miniscule. So it only has one direction to go: dramatically up.

Q *What is limiting full-blown adoption today?*

A Broadband adoption is leading to a whole new set of economics for media distribution. Games are the one media type

that people have not been able to figure out how to distribute beyond going retail and buying a box. Now it's possible to have a retail-quality content experience delivered efficiently over narrowband and fantastically over broadband.

Q *What does the future hold for custom-publishing and advertising through games?*

A I don't think there are any official projections on custom-published games; it's not something being tracked closely. My guess is that because of how consumers spend their time, you're going to see a lot more product placement in retail games, which is starting to occur. From a retail and advertising perspective, it's going to be huge. You're going to see a big explosion of custom-published games. Games are not a lion's share of any company's advertising budget...not yet anyway. Ultimately they will be, but that's a few years out. ❖



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advertising sales offices

Group Publisher

Mark Finkelstein
TEL: 603-891-9133
FAX: 603-891-9297
E-MAIL: mark@pennwell.com

Associate Publisher

Randy Jeter
1150 Lakeway Dr.
Ste. 217
Austin, TX 78734
TEL: 512-261-1998
FAX: 512-261-7915
E-MAIL: randyj@pennwell.com

Reprints

Carol Woodward
98 Spit Brook Rd.
Nashua, NH 03062-5737
TEL: 603-891-9157
FAX: 603-891-9409
E-MAIL: carolw@pennwell.com

List Rental

Bob Dromgoole
98 Spit Brook Rd.
Nashua, NH 03062-5737
TEL: 603-891-9128
FAX: 603-891-9341
E-MAIL: bobd@pennwell.com

United Kingdom

Amanda Loftus
TEL: 44-1793-641571
FAX: 44-1793-610001
E-MAIL: amandal@pennwell.com

France

Luis Matutano
TEL: 33-1-47-91-70-11
FAX: 33-1-55-02-03-85
E-MAIL: luism@pennwell.com

Germany

Holger Gerisch
E-MAIL: holgerg@pennwell.com
and
Johann Bylek
E-MAIL: johannb@pennwell.com
TEL: 49-89-904-80-144
FAX: 49-89-904-80-145

India

Rajan Sharma
TEL: 91-11-2686113/14/
26865103/26861758/
26861766861113
FAX: 91-11-26861112
E-MAIL: rajan@interadsindia.com

Korea

Paek Kwon
TEL: 82-2-420-1293
FAX: 82-2-420-1294
E-MAIL: keskor@kornet.net

Japan

Akiyoshi Kojima
TEL: 81-3-3261-4591
FAX: 81-3-3261-6126
E-MAIL: kojima@media-jac.co.jp

Taiwan

Teresa Fu
TEL: 886-2-8771-9388
ext. 240
FAX: 886-2-8773-7066
E-MAIL: Teresa_Fu@acertwp.com.tw

Hong Kong & China

Adonis Mak
TEL: 852-2-838-6298
FAX: 852-2-838-2766
E-MAIL: adonism@actintl.com.hk

Singapore

Joanna Wong-Monis
TEL: 65-6836 2272
FAX: 65-6735 9653
E-MAIL: jwong-monis@publicitas.com

Director, Internet Services

Tom Cintonino
TEL: 603-579-9002
FAX: 603-579-9030
E-MAIL: tomc@pennwell.com

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David Madden, the executive vice president of WildTangent, oversees the company's custom-published gaming segment. For more information on the use of custom-published on-line games for advertising, see "Double Coverage," pg. 32.

Customizable Content

Interest in personalized and product-driven on-line games is growing among vendors, as well as consumers of all ages

Q *How exactly would you define a custom-published game?*

A Games that tie to brands and, for the most part, are provided free to consumers are what we refer to as custom published. Typically brought to you by advertisers, the game tends to be more of a vignette of a full game, as opposed to a 40-hour experience. It's essentially an interactive commercial for a specific product or group of products. If you're playing a Toyota game, for example, the star of the game is a Toyota car; the consumer chooses the model and the color. It's broadcast on the Internet for the target audience the advertiser wants to reach. Product placement is just the tip of the iceberg. The company gets a big bang for its investment with the campaign.

Q *What is the potential audience for custom-published games on-line?*

A Consumers are increasingly savvy in their media habits. Today, they are much more empowered to make decisions about how they are going to spend their time, instead of just sitting there, forced to watch a 30-second commercial. So the efficacy of traditional advertising is dwindling, and advertisers have to figure out how to communicate and build relationships with their customers in environments where the customers want to be. Gaming is booming among many

important demographics that advertisers are trying to reach. If you look at how young men, teenagers, and middle-aged women are spending their time, it's increasingly with games and less so with television. In fact, the Neilson ratings in the fall of 2003 showed a steep decline in males aged 18 to 34 watching prime-time TV, and the number one culprit, ahead of DVR and DVD playing, was video games.

Q *How can companies take advantage of this recent sea change in consumer habits?*

A It's understood among marketers that games and the Web are taking up an increasingly large portion of consumers' media and entertainment habits. Yet, it's not the easiest medium through which to reach people. A typical retail video game can take years to make, and early in the development cycle, it becomes fairly rigid in terms of what can be done for an advertiser.

Q *Which advertisers already have invested in custom-published games?*

A Companies like Nike, Pepsi, Toyota, Chrysler, and Coca-Cola have taken advantage of this ability to access tough-to-reach demographics in ways that don't just get them for 30 seconds of viewing, but can actually get them involved with the brand and immerse them for hours per execution.

Q *What are the benefits of custom-published games?*

A These games enable marketers to build a community and experience around their products or brands without making people feel marketed to. You can create a game that's incredibly enjoyable and not just a show for branding. If the production is done right on any kind of media, the advertising can be really entertaining and engaging. Video games happen to be an ideal platform for that.

Q *Are custom-published games successful today?*

A If you can custom-publish a game that can be produced relatively quickly to meet up with an advertiser's product cycles, then you can tie into much bigger campaign themes, events, and promotions, and then deliver them on-line. With a high-quality gaming experience that has the right gameplay and viral aspects to it, you can reach a huge audience immediately.

Q *Are such games limited to on-line play?*

A The games are typically designed for on-line delivery, but they can be put on a CD-ROM and distributed physically. That way, an advertiser can hand out disks by the millions at sporting

Continued on page 46

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