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March 2004 www.cgw.com

Half-Life 2

A Whole New Game

The long-awaited sequel
delivers enhanced characters,
environments, and interactivity

64-Bit Graphics
Next-generation
hardware arrives

Linux Studios
Content creators
adopt the other OS

Super Bowl Spot
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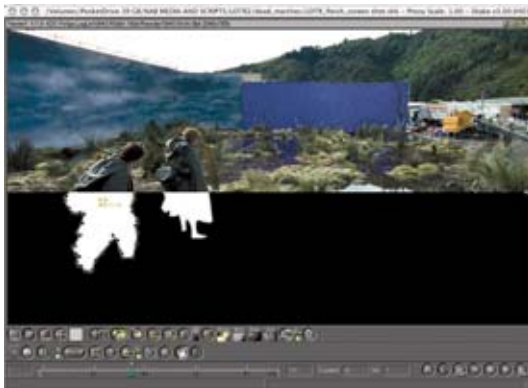
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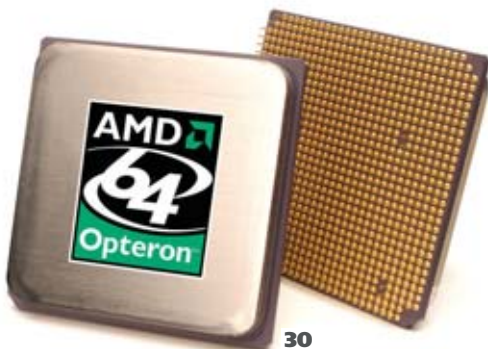
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Artists at Valve created Alyx, the 3D sidekick of scientist Gordon Freeman in the new action game *Half-Life 2*, using mainly Softimage|XSI. See pg. 16.





Phil LoPiccolo
Editor-in-Chief

All-Natural Animation

For years, we've been waving the flag that the visualization and simulation market has been one of the most dynamic in the computer graphics industry. Now, the latest research confirms that the trend is continuing. According to a new 3D Visualization and Simulation report from Acacia Research Group, sales of products and services to viz/sim markets—including scientific and medical, defense and government, design and engineering, and industry and business segments—will grow at a compound annual growth rate of 16 percent through 2007.

The main reasons for this solid upswing are obvious. No other technique has been as valuable in helping researchers explore data by visualizing the otherwise invisible. But recently, simulations and visualizations have been finding their way out of research labs and into mainstream applications. Indeed, scientifically accurate CG animations have been appearing in everything from television news and special programming to presentations to corporate and government funding agencies.

Some of the most dramatic examples have been the animations created to explain the recent Mars mission to a non-technical audience. In fact, one of these, an "engineering-accurate" CG animation of the Mars Exploration Rover *Spirit*, is part of the testimony that NASA is scheduled to present to the US Congressional Science, Technology, and Space Subcommittee about the technology used in NASA's Mars Exploration Program (see <http://marsrovers.jpl.nasa.gov/gallery/video/spirit01.html>).

The animation, created for NASA by Analytical Mechanics Associates in Hampton, Virginia, drew on telemetry information received during *Spirit's* actual landing and assigned it to the elements of the CG craft, including its parachute, shield, lander, and so forth. The animation team combined that with actual terrain data from the Mars Orbiter Laser Altimeter to depict the entire sequence, from parachute deployment to the final landing, when the airbag-shrouded craft bounced across the surface of Mars and ground

to a halt with its base pedal in optimal position. Besides being shown to Congress, this and similar animations have been shown in TV programs, print publications, and Web sites.

Until recently, space scientists had to rely solely on artists' renditions to convey information about space missions—since, obviously, no cameras have been on hand to record the events. Similarly, many others have used conceptual animations to explain technical information. In fact, one need only look at the dubious history of television commercial animations, which explain the secret work-

ings of everything from floor wax to breath mints, to see some creative examples.

There is certainly a place for artistic animations. They can be more entertaining and more humorous, and they can do a better job of inspiring and making one believe in a general idea, notes Rob Kline, group leader at Analytical Mechanics Associates. "But real visualizations are easier to believe because they're based on actual data," he says. "The *Spirit* entry, descent, and landing animation is being used to explain the technology and prove that it worked. It's a virtual video playback of what happened."

The need for visualizations and simulations will continue to expand, not only from the traditional vis/sim community, but also from non-technical segments of the CG industry. If animators meet this demand, they can help create a more visually literate and better informed public—as well as a whole new market for themselves. ■

Data-driven
animations can
help create a
more visually
literate society.

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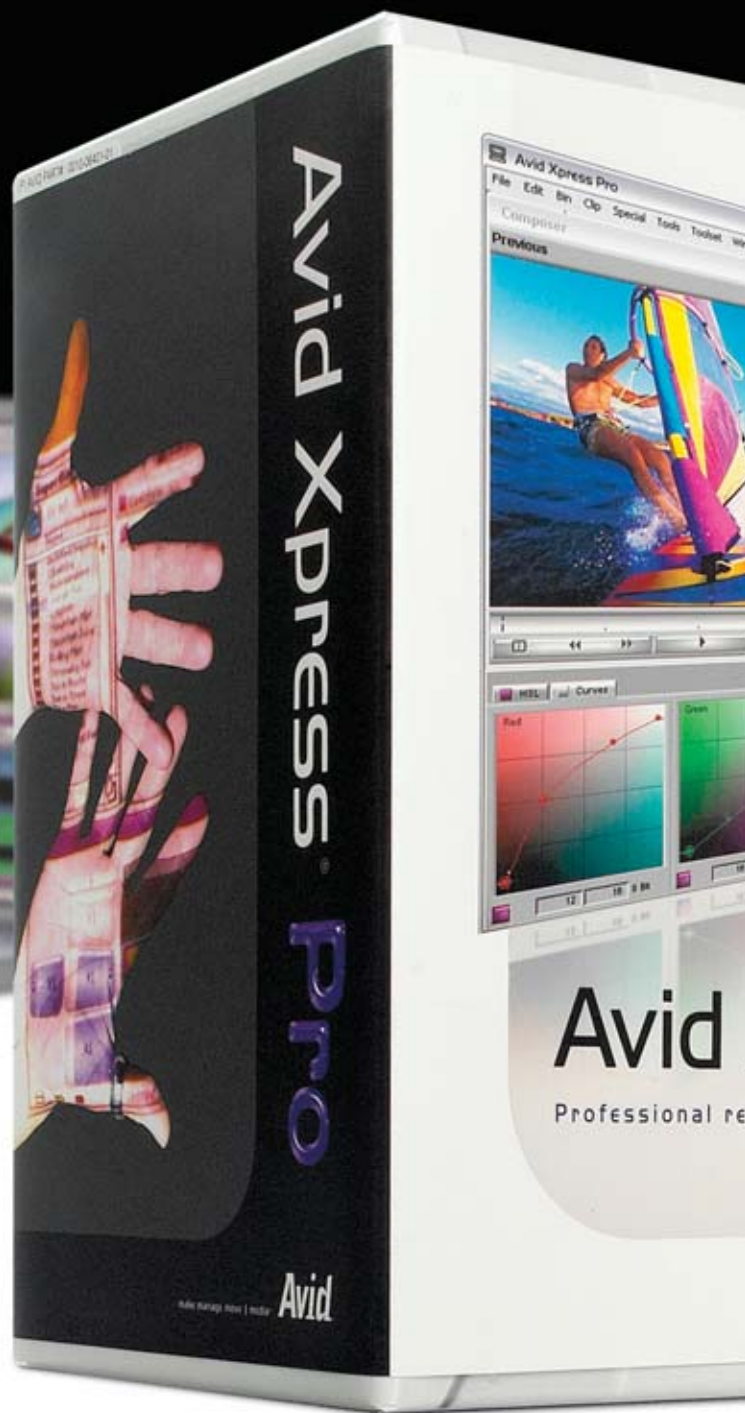
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products | mobile graphics

ATI Delivers Mobile Gaming Chips

ATI Technologies recently announced two new mobile graphics innovations, the Imageon 2300 and Mobility Radeon 9700 graphics processing unit (GPU) chipsets.

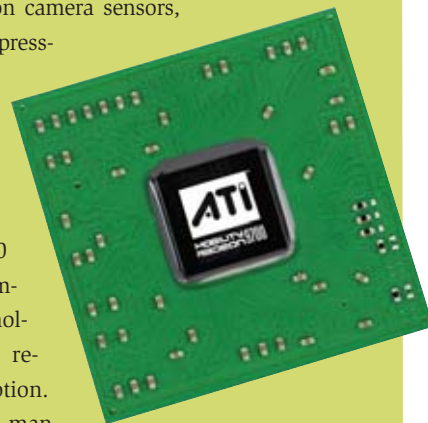
Its first 3D gaming chip for cell phones, the ATI Imageon 2300 brings advanced 2D and 3D graphics performance to mobile phones. The company's new co-processors benefit game developers, who are no longer limited by simplistic game designs for the mobile format. To enable hardware-accelerated 3D gaming experiences, the Imageon 2300 employs a 3D engine in a power-efficient multimedia companion chip designed specifically for the latest generation (2.5G and 3G) of feature-rich mobile phones and handheld devices. In addition to supporting the OpenGL ES rendering API, the Imageon 2300 offers video capture ports with support for high-resolution camera sensors, JPEG CODEC for compressing and decompressing images, two display engines, an embedded frame buffer, and MPEG 4 decoding with real-time video playback.

ATI also extended its line of mobile graphics processors with the Mobility Radeon 9700. The Mobility Radeon 9700 is said to be the first chip for mobile computers to ship with TSMC's Low-K technology, enabling high clock speeds while reducing power consumption.

PowerPlay 4.0 power management further lengthens

battery life, whereas full floating-point precision, programmable shaders, 6X full-scene anti-aliasing, and 16X anisotropic filtering lend to cinematic visual quality. VPU Recover enables crash-proof graphics, while support for Microsoft's DirectX 9.0 technology drives more than 100 of the top DirectX 9.0 game titles. —Courtney E. Howard

■ **ATI Technologies;** www.ati.com
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3D painting

products

Maxon Demonstrates BodyPaint 3D R2

Maxon will be on hand at the upcoming Game Developers Conference to introduce attendees to its latest software solution, BodyPaint 3D Release 2.

During the exhibition, Maxon will demonstrate many new features of its 3D painting program that are well suited to the gaming community, including an entirely new work flow. A Painting Set-up Wizard contributes to the software's ease of use, whereas enhanced support for Adobe Photoshop filters and Alias's Maya extends its flexibility and functionality.

Now available for Windows and Macintosh operating systems, BodyPaint 3D Release 2 carries a \$795 price tag. BodyPaint 3D is available to students, teachers, and schools at a discounted price. —CEH

■ **Maxon;** www.maxon.net
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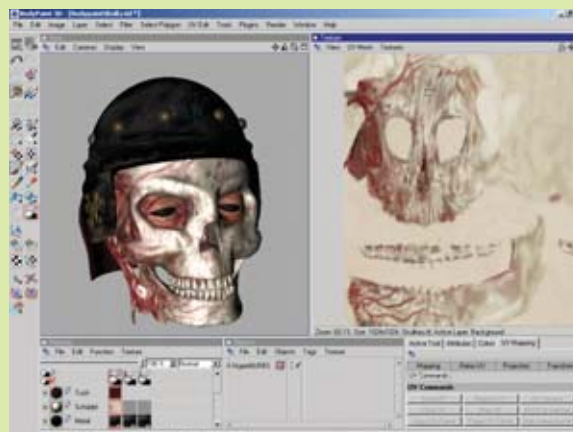


Image courtesy artists from MBA-Studios for the game Sacred from game distributor Ascaron.

Media 100 Upgrades 844/X to Version 3

Media 100 has introduced Version 3.0, reportedly the largest software expansion of its 844/X video editing system since its inception in 2002.

Version 3.0 takes advantage of the GenesisEngine's parallel image processing pipelines to deliver multi-stream

effects, such as glow and shadow. A new 10-bit keyer incorporates advanced spill suppression and matte-based key operations, as well as provides users with expanded keying controls, such as luma, threshold, softness, transparency, and others. Additionally,

844/X Version 3.0 features performance optimizations to aid in editing longer-form, layer-intensive projects.

All-new 3D digital video effects (DVE) processing, support for XML-based metadata interchange, and a wealth of work flow features, such as user-definable views and presets for customizing the work space, complete the new offering. Media 100's 844/X Version 3.0, including both hardware and software, starts at \$9995. Custom configurations begin at \$20,000. —CEH

■ **Media 100;**
www.media100.com
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NXN Unveils alienbrain Studio 7.0 at GDC 2004

Game-development professionals attending the Game Developers Conference in San Jose this month will be among the first to see a preview of NXN Software's latest offering, Version 7.0 of NXN alienbrain Studio.

This latest release of NXN Software's award-winning digital asset management (DAM) system boasts several productivity enhancements. Among them are a focus on usability and seamless integration into not only digital content creation processes, but also pre-existing IT infrastructure.

Alienbrain Studio's user interface has been revamped to increase its intuitive nature and to reduce the potential for usability errors. Moreover, its Change Management

Process has been enhanced in Version 7.0 with a Change Sets utility, designed to add more structure and transparency. New storage management features enable users to take full advantage of available system resources. At the same time, the newly upgraded version

aids users with the removal of project-size restrictions.

NXN Software anticipates shipping alienbrain Studio 7.0, at a cost yet to be announced, later this year. —CEH

■ **NXN Software;** www.alienbrain.com
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RealViz Premieres Stitcher 4.0

RealViz has launched Stitcher 4.0 professional-level panorama software for Mac OS X.

Stitcher is designed to assist multimedia and 3D artists in the creation of quality panoramas for



3D, Web, film, and print applications. A direct response to user feedback, Version 4.0 provides increased support for popular image-editing programs including Adobe's Photoshop. Interactive Quick-Time VR previewing increases accuracy as users adjust QuickTime default parameters, whereas interface and work flow enhancements lend to time-savings and ease of use.

RealViz Stitcher 4.0 currently is available for Windows and Mac platforms at a cost of \$499. Users of previous versions can upgrade to Version 4.0 for \$180. —CEH

■ **RealViz;** www.realviz.com
 infoNOW 103

A Star is Reborn

Twenty-five years ago, the campy science-fiction series *Battlestar Galactica* was one of TV's shining stars, with bumpy-headed aliens and model-kit spacecraft that were typical of the era.

Since then, digital effects in film and television have become far more sophisticated and realistic. Yet when producers recently brought this classic back to the small screen in a two-part miniseries for the Sci Fi Channel, they decided to pay homage to the original show by using state-of-the-art tools and techniques to replicate various effects from yesteryear.

"We had a lot to live up to," says Lee Stringer, CG supervisor at Zoic Studios (Los Angeles), which created the digital content for the four-hour miniseries. "We took hints from the original show and then took that a step or two further by adding another level of detail and realism."

In particular, the artists mimicked the look of the practical models/miniaturess. To accomplish this, Stringer searched for retro model kits similar to those from the late-1970s to detail portions of the *Battlestar Galactica* space-



Using LightWave, digital artists created this large nebulous environment for the miniseries *Battlestar Galactica*, a retelling of the 1970s classic science-fiction television show of the same name.

ships. Using these practical model-kit parts for reference, the Zoic artists recreated the spacecraft in the computer using NewTek's LightWave content-creation software running on Pentium 4 Xeon PCs with Nvidia Quadro 4 graphics cards.

"I wanted the look to resemble what it was years ago," says Stringer, "but I didn't want the parts to fit perfectly." The audience may not have noticed these inconsistencies, but Stringer believes that, subconsciously, it helped remove the pristine CG edge from the 3D models. This was further accomplished by keeping the amount of hand-painted CG textures to a minimum, employing, instead, photographic textures applied with Adobe's Photoshop and Corel's PhotoPaint.

On one hand, the artists were trying to add flaws to the imagery; on the other, they were focusing on realism, particularly when it came to animating the spaceships. In addition, they created realistic digital people, set exten-

sions, and complete CG environments.

For further realism, the team incorporated the studio's hand-held documentary camera style that it had used for the short-lived sci-fi series *Firefly*, for which Zoic received an Emmy last year.

"That jarring style—which is intended to give viewers the feeling that they are part of the

action and story—is something that would have been tremendously difficult to do years ago," says Stringer.

To render the CG imagery, which was shown in 1920x1080 (high-definition) resolution, the artists used LightWave. They first completed a film pass for the lighting using ambient occlusion to take the CG edge off the models and to add subtle nuances typically achieved with a radiosity-based renderer. Then they created key and interactive passes for an added layer of believability.

The group composited the imagery using Discreet's combustion and flame. In addition, all the animators used NewTek Video Toasters coupled with television monitors, which allowed them to do temporary compositions in combustion and Adobe After Effects that they could then review in real time within a simulated TV viewing environment.

As a result of this work, Zoic was able to preserve the charm of the original series while infusing it with some "out of this world" effects to retell the *Battlestar Galactica* story and make it appealing to a whole new generation of potential fans. —Karen Moltenbrey

KEY TOOL: LightWave, NewTek
www.newtek.com
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For a retro look, the artists replicated the spaceship-building technique used in the '70s, only this time using CG.

Zero to rendered in no time flat



Image Rendered on an Alienware MJ-12 Workstation



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Match Moves

Game publisher Microsoft Game Studios (Salt Lake City) recently teamed with developer Power & Magic Development (Paris) to serve up ultra-realistic action for their recent Xbox title *Top Spin*, bringing world-class tennis action into the virtual realm of computerized gaming.

Top Spin, which offers singles or doubles matches, pits players against 16 of the sport's leading tennis stars, whose signature moves were motion captured and incorporated into the animation for authenticity. A local tennis pro "played" against the ranked players, enabling the Microsoft team to acquire the most realistic movements from the stars.

According to Bruce Gil, motion-capture manager at Microsoft Game Studios, the group acquired more than 750 specialized movements during separate mocap sessions with tennis greats including Pete Sampras, Martina Hingis, Lleyton Hewitt, Elena Dementieva, Jan-Michael Gambill, Anna Kournikova, and Barbara Schett. Microsoft Game Studios secured access to the busy pros during a



Microsoft Game Studios used a Vicon MCam 2 motion-capture system to acquire authentic moves of top-ranked tennis players for its *Top Spin* Xbox game.

The group, which had just purchased the Vicon system for its Xbox game division, had one week of training before heading to the Miami Convention Center for its first capture session. There, the technicians positioned 12 high-res Vicon MCam 2 cameras around a 40x40x10-foot capture area.

To create a realistic environment for the players, the team installed a tiled SportCourt surface, and taped lines on a mock half-court. So the tennis stars could move naturally within this space, the technicians mounted the MCams on

a 60x60x12-foot box truss, which was suspended high above the space as to not hinder the players' actions.

Each pro was then suited up for digital play, as 45 Vicon markers were placed on the person's body, while a set of lightweight 9mm markers

were attached to the racket frame. The group, which had just purchased the Vicon system for its Xbox game division, had one week of training before heading to the Miami Convention Center for its first capture session. There, the technicians positioned 12 high-res Vicon MCam 2 cameras around a 40x40x10-foot capture area.

to create a realistic environment for the players, the team installed a tiled SportCourt surface, and taped lines on a mock half-court. So the tennis stars could move naturally within this space, the technicians mounted the MCams on a 60x60x12-foot box truss, which was suspended high above the space as to not hinder the players' actions.

Each pro was then suited up for digital play, as 45 Vicon markers were placed on the person's body, while a set of lightweight 9mm markers were attached to the racket frame. The group, which had just purchased the Vicon system for its Xbox game division, had one week of training before heading to the Miami Convention Center for its first capture session. There, the technicians positioned 12 high-res Vicon MCam 2 cameras around a 40x40x10-foot capture area.

“This enabled us to record unique nuances while encouraging the players to move and react as they normally would,” says Gil. “We recorded two full minutes of the players doing their moves the way only they would do them, which gave us long, pretty much unbroken sequences of movements, including the preparation of the serve, the serve itself, the serve follow-through, the reaction, and the return.”

“Even with the large size of our capture volume, the data we acquired was amazingly accurate,” Gil notes. “If something passed out of the volume—like Sampras’ tall frame jumping to unbelievable heights—we had enough collective information to reconstruct the move.” —KM

KEY TOOL: MCam 2 system, Vicon
www.vicon.com
 infoNOW 105



One of the featured players is Lleyton Hewitt, shown in the video game (left) and being motion captured (right).

two-week time span as they rotated through the NASDAQ 100 tournament in 2002. As a result, the team had little notice for setting up its Vicon mocap system, attaching the light-reflective markers to each player, and then capturing a wide range of movements.

were attached to the racket frame.

“This enabled us to record unique nuances while encouraging the players to move and react as they normally would,” says Gil. “We recorded two full minutes of the players doing their moves the way only they would do

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Game Sales Shake Up

According to the Entertainment Software Association (ESA; www.theESA.com), the US association representing computer and video game software publishers, new data reveals that the percentage of Mature-rated games sold in 2003 declined, whereas the number of Teen-rated games sold last year rose.

The 2003 US sales figures announced by the ESA and compiled by the NPD Group, a global market information company that measures product movement and consumer behavior, indicate the majority of games sold were rated E for Everyone (54 percent), followed by T for Teen (30.5 percent), and M for Mature (11.9 percent). In 2002, E-rated games accounted for 55.7 percent of games sold, whereas T-rated and M-rated games made up 27.6 percent and 13.2 percent of games sold, respectively. Of the top 20 best-selling console games, 70 percent were rated E or T; and, an impressive 90 percent of the top 20 computer games were rated either E or T.

In 2003, game sales in the US reached a new pinnacle: Combined sales for computer and video games exceeded \$7 billion for the first time. Overall, US sales of console games totaled \$5.8 billion (186.4 million units), and computer games accounted for \$1.2 billion (52.8 million

units) in sales. In 2002, game software sales totaled \$6.9 billion, with console games contributing \$5.5 billion in sales, and computer games adding \$1.4 billion.

Also in 2003, a record number of console video games exceeded the 500,000 or 1-million mark in terms of units sold.

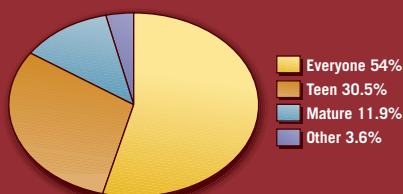
A record nine console games sold more than one million units—all of which were rated E or T. Thirty-nine console games sold more than 500,000 units, and 83 titles exceeded 250,000 units.

ESA president Douglas Lowenstein suggests that, based on 2003's record number of blockbuster hits, the popularity of video games is strong and growing. And, he believes, the industry is producing a broad array of entertaining content appropriate for and appealing to people of all ages. Lowenstein also notes that entertainment software continues to outpace the annual growth posted by the movie and music industries.

According to numbers compiled by the NPD Group, in fact, total game software sales in 2003 grew while both the movie and music industries reported losses compared with 2002 sales, according to estimates by Exhibitor Relations and Nielsen SoundScan respectively.

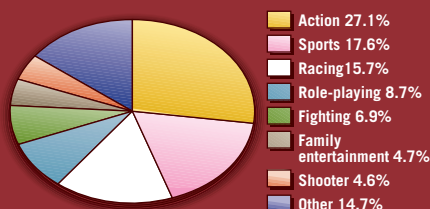
—Courtney E. Howard

2003 US game sales



Recent trends indicate an increased interest in Teen- rather than Mature-rated games.

Console game sales



A lion's share of the console games purchased in the US throughout 2003 fall into the action genre.

news

In Brief

Atari (Los Angeles) entered into an agreement to sell its Games.com Internet address to **Games, Inc.** for \$1.125 million in cash and stock. The sale, expected to close at the end of the month, also includes Games' acquisition of digital licenses and sub-licenses for such games as *Monopoly*, *Scrabble*, *Risk*, *Battleship*, *Boggle*, and *Yahtzee*. A developer of video production and conversion technology, **Focus Enhancements** (Campbell, CA) made public not only an agreement to acquire **Visual Circuits**, maker of networked digital video systems, but also its intent to acquire **COMO Computer & Motion**, a company in Germany that makes video content management and processing solutions. **Alias** (Toronto)

announced that it is in discussions with a private equity investment firm regarding the acquisition of Alias from **Silicon Graphics Inc. (SGI)**. As a result of the transaction, Alias would become an independent entity, but the company's management team, organization, services, support, and product availability would not be changed. **Pixar** (Emeryville, CA), having ended discussions with **The Walt Disney Company** to extend their existing five-picture deal, will begin discussions with other studios to distribute its films beginning in 2006. After completing the final two films under the current agreement, *The Incredibles* in 2004 and *Cars* in 2005, Pixar intends to retain full ownership of its future productions. —CEH

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Alternative Editing

By Stephen Porter

When you consider the world of desktop video editing, three non-linear editing (NLE) programs stand out as market leaders—Adobe Premiere Pro, Apple Final Cut Pro, and Avid Xpress. Although most any professional video editor would love to own a high-

end Avid Media Composer or a Discreet smoke system, for many people the price tags of such systems make them cost prohibitive. When that's the case, the chances are good that those editors will turn to one of these three packages that dominate the lower end of the price spectrum.

However, alternatives exist. And these programs have enough happy users to make them worth considering before simply following the crowd to the most obvious offerings.

One such user is Harry Maxon of Max Moss Productions, a postproduction facility based in Los Angeles that edits independent films and demo reels. A former Avid Xpress and Final Cut Pro user, Maxon switched to Media 100's 844/X system roughly a year ago, and he could not be more pleased.

What attracted



VelocityQ software offers an interface to its hardware-based capabilities, such as real-time, full-quality playback and mixing of four video streams and up to six graphics streams.

Maxon was the system's real-time power. "For years, I wanted a smoke system, but it was too expensive for us. Then I saw the 844/X, and it did 80 to 90 percent of what smoke did, and even more in some ways. It didn't have the 3D capability of smoke, but it was certainly less expensive and enabled me to hook up enough storage to make long form a possibility."

As for the system's stability, Maxon has experienced no problems. In fact, he spends less time troubleshooting the 844/X than he did Final Cut Pro. "The system is amazingly stable and customer support is great. The real-time power attracted us, and the stability sold us."

Interestingly, however, Media 100 is not eager to position itself as a competitor to Final Cut Pro, Premiere Pro, and Xpress. Mike Savello, Media 100's vice president of sales and marketing, makes clear his belief that the 844/X system is a different kind of animal—an on-line "vertical" editing system, rather than a traditional, horizontally focused NLE. Unlike those other programs, he says, "844/X enables fast, unlimited, layer compositing with 10-bit uncompressed image quality in an editing and compositing work flow."

While the distinction is valid, there's no getting around the fact that the recently reduced prices of the 844/X systems—full turnkey systems now start at \$20,000—make Media 100's offerings a viable alternative in the desktop editing market.

Another company that shies away from being called a competitor to Final Cut Pro, Premiere Pro, and Xpress is Leitch, maker of the Velocity and VelocityQ editing systems. Like Savello, Mike Nann, product marketing manager of professional postpro-

Stephen Porter is a CGW contributing editor and a freelance writer who has been covering video, graphics, and digital content creation technologies and applications for more than 15 years. He can be reached at sporter@gsinet.net.

Rather than making a knee-jerk purchasing decision, consider the full-range of NLE options

duction for Leitch, argues that the Velocity systems are targeted toward a higher-end user with greater performance and productivity requirements.

Defending that distinction, Nann notes that the other three offerings can function independently of any specific hardware, as "software-only" solutions. In contrast, he says, "All our NLE products won't function without our proprietary hardware. That leads to some considerable advantages for us, particularly in terms of true full-quality, real-time performance. Our customers often base their buying decision on the hardware as much as the software."

It's a valid point, and given that a VelocityQ software and board set costs \$10,000, perhaps it's not an option for a user who can get by just fine with a software-only configuration of one of the other three packages. But when you start adding SDI boards, large amounts of storage, and a beefed-up hardware platform to those software-only solutions, the costs really aren't so different.

Dave Hutton, a 2D/3D visual effects artist at Platform Advertising in Kansas, says he assembled six VelocityQ editing systems for his company at just \$16,000 apiece. "We went with Velocity because of the price and because of what it can do for that price," he says. "Given that we have to crank out so many spots per day, we just couldn't go with anything slow."

Editing Options Abound

While Leitch and Media 100 provide some attractive alternatives to Final Cut Pro, Premiere Pro, and Xpress at the higher-end of the price spectrum, three companies that offer alternatives that are more affordably priced are In-Sync, Pinnacle, and NewTek.

Of these three, In-Sync checks in with the highest-priced alternative in the form of Speed Razor 5.6, which comes bundled with the company's Loki uncompressed SDI capture hardware for \$3999. This PC-based Loki bundle is designed to handle multi-stream, real-time, uncompressed SDI editing.

In terms of product differentiators, Speed Razor's flexible interface and its speed are clear strengths, according to Jerry Hergenreder, In-Sync's director of sales and marketing. "We generally render at least three times faster than our competitors and have about 167 threads of multi-processor support in our applications," he says. "The Loki bundle can handle most anything you throw at it. With Loki, you can edit in 10-bit and 8-bit formats. You can mix and match color on the same timeline, and you can edit DV and uncompressed with 32-bit RGBA graphics and never artifact."

Kevin Christopher, production coordinator at AGI Studios in Atlanta, confirms those advantages. AGI Studios has been using Speed Razor for several years and recently took a serious look at both Final Cut Pro and Adobe Premiere. But in terms of speed, price, and user interface, he believes Speed Razor was the winner.

"Final Cut Pro requires a lot more storage to run than Speed Razor, which makes a fully configured system more expensive," Christopher says. "As for Premiere Pro, it didn't have the drivers yet for the SDI cards that we need. Also with Premiere, there is no real

time. Everything has to be rendered."

Two other programs worthy of consideration are Pinnacle's Liquid Edition and NewTek's VT[3] software, each offering its own unique list of advantages. Liquid Edition Pro at \$999 is perhaps one of the most competitive offerings from a pure price standpoint. Among its strengths are support for up to 10 streams of real-time DV and graphics, the ability to author and burn DVD/VCD/SVCDs directly from the timeline, and the fact that multiple users can edit directly off shared storage. Liquid Edition also works well as a mobile, laptop-based editor, which can be especially attractive to users who own other Pinnacle production systems, such as Liquid Blue or DekoCast.

Price competitiveness and compatibility with other applications in the company's product family also are strong selling points for NewTek's VT[3]. It's actually an integrated production suite that includes not only VT-Edit, but also numerous software modules, including a character generator, a live production switcher, on-screen monitors and waveform/Vectorscopes, paint and 2D animation, and most significant, NewTek's flagship offering, LightWave 3D 7.5 modeling and animation software.

Priced at \$2995, the package is a compelling offering. Adding to its attractiveness, says Paul Lara, VT[3] product manager, is that VT-Edit handles multiple layers of either DV files or uncompressed video streams in real time.

"With VT-Edit, you can edit in on-line quality with full resolution at all times," says Lara. "All effects are shown in real time at full resolution, and the software accepts larger-than-video resolution images for pan and scan effects, shadows, color correction, 3D manipulation—all in real time."

With programs like VT[3] offering such impressive capabilities, anyone racing to buy a desktop video editing system certainly would be well advised to slow down long enough to consider all the options. ■■



The speed of Media 100's 844/X enables users to work in real time, allowing them to enhance and tweak scenes without waiting for rendering.

Valve's highly anticipated computer game sequel pushes gaming into another realm

By Martin McEachern

Just as motion pictures began as a technological novelty, interactive storytelling remains in a similar state, awaiting classics that will finally unleash the emotional potential of the medium. Millions of players would agree that one such classic is *Half-Life*, a 1998 PC title from Valve that obliterated the formulaic mold of the first-person shooter by charging its narrative structure and action-packed gameplay with "real" emotion.

Now, a little more than five years later, it appears that this groundbreaking title is being followed by another—*Half-Life 2*—whose realism, interactivity, and artificial intelligence have already earned it industry accolades, including E3's Best of Show, months before its mid-March release.

Half-Life 2's story line picks up where the original left off, with Gordon Freeman, a government scientist, once again battling aliens that are pouring through an inter-dimensional doorway that he unwittingly opened as a result of a botched physics experiment. While the plot may seem typical for the genre, the execution of the original, and now the sequel, by the artists at Valve was anything but. According to Valve's founder and managing director Gabe Newell, *Half-Life* became the new water-mark for first-person shooters because it was the first to present a "seamless string of surprising events," a mystery that unfolded with cinematic suspense and pacing, all within a consistently dark and spooky atmosphere.

Unlike similar titles in which the gameplay entails little more than reaching a level's end or finding color-coded keys to color-coded doors, *Half-Life 1* and *2* are engrossing because their goals and structural high points elicit a wider variety of emotional reactions from the player. Gordon Freeman, far from being a trigger-happy cardboard cutout, is a multi-dimensional character whose actions and decisions are complicated by simulated real-life consequences and conflicting motivations, including survival and heroic altruism.

In fact, the intensity of the player's immersion in the game is achieved through two bold departures from current conventions in computer-game character development, both of which radically affect the player's point of view. First, at a time when developers are relying more and more on elaborate cut-scenes, third-person scripted sequences, and celebrity voice-acting talent to create fully formed characters, *Half-Life*'s protagonist never says a word throughout the entire game. Second, the game doesn't allow the player to experience the story through anyone's eyes but Freeman's, so the character is never privy to any more knowledge than the player, thus encouraging the player to empathize with Freeman. As Newell states, "You are Gordon Freeman."

Half-Life Retooled

The sequel finds Gordon—now under the employ of the G-Man, a mysterious briefcase-toting figure from the original—charged with saving Earth before its resources are depleted and mankind is driven into extinction by the aliens. His mission takes him to City 17, a fictitious European locale resembling a hodgepodge of such Northern European towns as Budapest, Prague, and Amsterdam, where Old World quaintness collides with high technology and futuristic flourishes. Forging across the sprawling cityscape and beyond, Gordon uncovers the ambiguous agendas of those around him, discerns friend from foe, and tries to chart the right course toward his mission's objective.

Along the way, Gordon contends with the ubiquitous combine soldiers—the city's corrupt and heavily armored police force—as well as a rogues' gallery of aliens, including a 50-foot-

High Expectations

Garnering more than 50 Game of the Year awards, the first *Half-Life* spawned a number of successful expansions and, with the subsequent release of the game's basic programming code, yielded a flood of user-created modifications resulting in new, free down-

loadable levels and characters. These, in turn, have led to "total conversions," entirely new games freely distributed over the Internet (such as *Counter-Strike*) that have formed the basis for a massive online gaming community that is continually weaving new threads into the ever-expanding fabric of the *Half-Life*

mythos. Consequently, during the last five years, fan enthusiasm and the boundless creativity of the mod community have stoked anticipation for a sequel to such a fever pitch that, upon its release this month, *Half-Life 2* is expected to single-handedly spark a revival of the PC game industry.

Half-Life

Larger than

Already receiving industry accolades, Valve's *Half-Life 2* computer game, expected to be released this month, features realistic human character models, including scientist Gordon Freeman (above), real-world physics, and advanced AI, all within an emotive story.

Images ©2004 Valve Corp.



The game features an array of characters, including the corrupt combine soldiers (above) and a host of unusual alien creatures such as the 50-foot-tall strider, all created using Softimage|XSI.

tall, flea-like creature with impaling legs called a strider; the pack-hunting ant lions; the water-dwelling hydra; and the parasitic headcrabs, which commandeer human bodies by affixing themselves to a victim's skull.

According to Newell, *Half-Life 2* was designed from the outset to fulfill the original game's potential as a medium for first-person storytelling. The sequel, therefore, abstains from using cutaways and cinematics that disrupt the player's subjective point of view (POV) on the narrative. In addition, the player's immersion in the first-person POV is intensified through an array of technological advancements debuting in *Half-Life 2*. The majority of those are embodied in the title's new game engine, dubbed Source. While

the original release was powered by Quake technology from id Software, Valve spent the past four years collaborating with Havok, developers of the Havok physics engine, to deliver enhanced character physics and environmental dynamics, which allow for unprecedented interactivity with objects adhering to the laws of nature.

Half-Life 2 also marks the arrival of Softimage as a major contender vying for game-authoring software supremacy. Throwing down the gauntlet to Discreet (3ds max) and Alias Systems (Maya), Softimage worked closely with Valve, making Softimage|XSI the sole digital content creation software used to create the game, and, thereby, resulting in an impressive showcase for its real-time 3D content creation capabilities.

Mod Ware

To firmly entrench itself in the future of game development, Softimage will package XSI EXP, a lite version of XSI, with every PC copy of *Half-Life 2*. With this, Softimage joins Discreet (which offers gmax, a free, scaled-down version of 3ds max) in adopting the increasingly popular strategy of cultivating a user base from the massive mod communities forming around blockbuster PC games. (Valve will still provide exporters for both max and Maya, but contends that XSI EXP—which allows modders to build models of similar complexity to those in the game—will yield the best results.)

Rolled into the mod SDK will be XSI EXP, the programming code for the AI and client systems, and nearly all the other tools developed for the new Source engine, including the Hammer world construction tool, which will allow modders to place objects and characters they've created in XSI in a world, edit the terrain, add water, provide pathing information for various AI entities, and control the AI through a system of inputs and outputs, just as Valve's level designers did. This move reflects Valve's continued commitment to the mod community, which has been responsible for much of *Half-Life*'s staying power and commercial success over the past five years.

Level Playing Field

Half-Life 2's environments, which are spread over 10 chapters, range from small indoor areas to the war-torn City 17, a massive urban dystopia where streets are lined with burnt-out buildings, and fires smolder beneath leaden skies. Valve's unique, multi-pronged pipeline for building the levels began with the formation of a "cabal," a team of modelers, level designers, and programmers who were responsible for the design and gameplay of a particular level.

In the first branch of the pipeline, the cabal's level designers built low-resolution texture maps for the environment and then replaced them with plain "orange" textures that accelerated play-testing and



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experimentation, saving the cabal from painting detailed textures for scenery that would likely undergo substantial changes later. In the second branch of the pipeline, the programmers worked on the code for the support “entities” in the level, such as monsters, vehicles, turrets, and gates. And in the final branch, the modelers built light, “placeholder” geometry for the various entities. Finally, once there was enough content to “play,” the three branches converged and the cabal members commenced testing their levels using the placeholder models, orange textures, and temporary code.

During this iterative process, every idea is discussed within the cabal, and interesting ones are tried, to see if they add to the gameplay experience. Any of these experiments has the potential to radically alter the scenery or entities in a level, but with Valve’s cabal-based pipeline, each level can be previsualized and play-tested with the least possible effort expended on creating detailed content that ultimately will be changed or deleted. “By separating the art and gameplay branches of production, we were able to avoid a potentially huge amount of wasted time and effort on the art side by using placeholders instead of real art,” says senior engineer Rick Ellis.

The developer further streamlined its pipeline by decoupling the art asset and level design streams of production as well. All the art assets were prefabricated in XSI by a team of artists and placed



The game’s dark, foreboding atmosphere resulted from the use of various CG light sources. This ominous look was further enhanced with volumetric fog and effects primitives, such as smoke and fire.

cal properties of their applied textures, including weight, density, and sound. For example, applying a brick texture to a rectangular object will automatically make it behave like a brick of that exact size; it will sink if dropped in water, explode if shot, and so forth. Objects also will acquire the friction and collision properties of their textures. Therefore, if a chair is mapped with a wood texture, it will not only float like wood and sound like wood, but, if scraped against a wall, also splinter like wood.

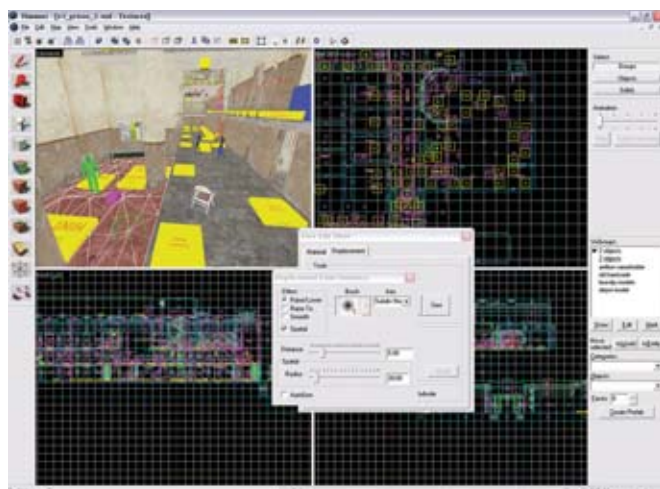
After the levels were play-tested and textured, the group lit them with lightmaps, whereby each surface’s texture was paired with maps of various lighting conditions for that surface. For illuminating the props, the artists used vertex lighting to store the lighting information at the model’s vertex. Depending on the demands of each scene, they drew upon a wide variety of lights, including spots, directionals, points, and ambients, to maintain the game’s ominous lighting and tone.

The dark, foreboding atmosphere overhanging the entire adventure also was enhanced with volumetric fog, one of Source’s numerous effects “primitives,” which also include fire and smoke. “On top of all this, Source’s shaders allowed us to make virtually any effect we could dream of,” says Ellis, noting that no off-the-shelf tools or plug-ins were used for the special effects.

Formidable AI

One of the pivotal sequences in the game unfolds on a dried-up seafloor, where Freeman tangles with soldiers and ant lions, and speeds across a sandy gorge in a land buggy to elude an aerial assault by alien hovercraft, his only shelter provided by the rocky terrain, some overturned cars, and a half-sunken skeleton of a submarine. While the level displays Hammer’s power in creating dynamic natural environments, it is more impressive for its demonstration of *Half-Life 2*’s advancements in contextual AI programming.

If Freeman tries to hide behind a rock, a car, or a closed door in the submarine, the AI programming provides the aliens and the soldiers with numerous paths to choose from in order to find him, such as pushing the car over the edge of the gorge, knocking out windows in the sub and peering through them, punching or shooting through the door, or climbing the struts and beams of the sub to continue the pursuit. These are not scripted sequences, but rather the AI working its way through the level, checking to see if the player is nearby, searching relentlessly for new ways to launch an attack, and then encountering and solv-



***Half-Life 2*’s level designers used the new Hammer world construction tool to place objects, edit the terrain, and control the AI.**

in a huge “backlot” of props for all the cabals to use. Designed to be easily editable through a cut-and-paste style, much of this virtual backlot will be made available to mod authors. It also will house every texture map and model used in the game, including such ready-made pieces of scenery as power stations, airplane hangars, and brick buildings, complete with a lower floor, a roof, and an expandable mid-section. It also will contain similar information for generic items, such as barrels, desks, chairs, tables, debris, and vehicles.

Valve’s world-creation Hammer tool set also features a proprietary materials system that endows these objects with the physi-



ing all the obstacles in its way until the target is destroyed. In a sequence set in City 17, for example, Freeman's attempt to elude the 50-foot-tall strider by bolting under an overpass is thwarted when the creature, through its AI programming, "learns" to get past the bridge by crouching down and clambering underneath it.

Maximizing the performance of this highly advanced AI system meant the artists had to refrain from overpopulating the levels with AI entities. Conversely, inserting too few entities would have resulted in an empty and uninteresting level.

Achieving optimal AI during gameplay by adjusting the number of entities in a level also was crucial to the performance of the brand-new physics engine developed for the game. The new engine not only melds the gameplay with unprecedented environmental interactivity and newfound realism in complex physics interactions, but, for the first time, also makes all the environmental objects available to the player for solving puzzles, avoiding enemy fire, or even using as weaponry for combat. "The new physics system allowed us to create interesting puzzle and gameplay experiences that were not possible with the Quake-based engine," says Ellis.

Character Building

Valve's bar-raising mandate for the game's graphics and gameplay also extended to the modeling, texturing, and animation of the characters. From their detailed brows, to the radial bands in their irises, to the imperceptible furrows in their foreheads, Gordon Freeman and the rest of the main cast are the result of an aggressive mission to leapfrog the current state of the art in character creation.

All the characters, including the humans and the more geo-

metrically complex creatures, such as the gargantuan strider, were surfaced using XSI's subdivision surface tools, which, says Ellis, provided not only a highly refined interface for intuitive, organic modeling, but also the expedience of automatically converting the finished subdivision surface models to their component triangles for in-game use.

For modeling each character, the team used photographic references of actual people, importing orthographic and perspective photos overlaid with grid markings into the XSI viewports to guide the modeling process. In addition, a second set of photos, comprising front and side images of the same people, were shot in more diffuse lighting for creating the face textures. The front and side textures, once resized, merged, and retouched in Adobe's Photoshop, were mapped to the models in XSI at a resolution of 2000x1500. The characters' eyes also were modeled elliptically, outfitted with a series of constraints, and placed off-center. Consequently, when facing the screen, the characters stare directly at the player without displaying the cross-eyed look that plagues most game characters.

Next, to ensure that the sequel would be completely devoid of the generic models that were used in the original game to furnish, for instance, the Black Mesa lab with a large staff of scientists, Valve developed a morphing technology that blends a core set of models for the game's common roles in almost infinite ways to render them entirely distinct from one another. Using the same morph targets sculpted for facial animation, the system automatically alters the facial geometry to create, for example, a flatter or broader nose, or a squarer jaw. As a result, all the scientists, soldiers, and other homogeneous characters appear

Digital Actors Studio

Surprised by how endeared they had become to some of the characters after finishing the original game, Valve's founder, Gabe Newell, and his fellow designers were determined to make *Half-Life 2* a more emotional experience, to give the cast full personalities, and to force the player to identify and empathize with many of them.

Heightening the game's emotional involvement was the impetus for the development of a highly sophisticated, proprietary face-acting technology based, in part, on the facial expression studies of Paul Ekman, a psychiatrist from the University of California, San Francisco. Ekman's systematized facial lexicon comprises 40 keyframes of expres-

sion, of which Valve selected 25 that could be blended into enough hybrid expressions to serve as the basis for a new facial animation system capable of endowing the characters with more natural speech and greater emotional expressivity.

To create these keyframes of expression, the team modeled 34 blend shapes for each character in XSI, and controlled them with an internal proprietary tool called Faceposer, which also offers precise control over lip synchronization. These targets were modeled below the level of actual expressions, depicting, instead, individual facial muscles in their flexed state, enabling the artists to create more natural facial animation. That's because each muscle group is accessed

independently, so all the muscle movements don't occur with the same envelope and "hit" at the same time.

In real time, the Source engine can combine the 34 blend shapes non-linearly to make the characters smile, sneer, snarl, or look fearful, menacing, sinister, victorious, condescending, and so forth. It also automatically lip-syncs the dialogue in any one of numerous languages, extracting phonemes from a .wav file and forming the corresponding phoneme blend shape for the mouth. In addition, the engine allows the characters to shift between expressions independently of the context of the line. The result is a finely calibrated and unique performance for every exchange between the player and a character.

as unique, differentiated models. Nevertheless, because the overall personality of a character's face is forged primarily by the facial texture, the system also draws upon a large database of facial texture maps to diversify and individualize the digital citizenry of City 17.

For the characters' bodies, the alien creatures required custom IK rigs, while all the main human characters were bound to a single, scalable base skeleton that was easily modified to suit each character's proportions. Both the humanoid default rig and the custom alien rigs were constructed in multiple levels of joint detail, providing the appropriate degree of articulation for the corresponding levels of detail (LOD) created for all the characters. Artists used most of these LODs to regulate the geometric complexity of a character with the proximity of the camera. However, one low-polygon version and its respective low-bone rig was used to create collision models showcasing the breakthrough rag-doll effects of the Havok 2 physics engine that simulate the involuntary behavior of the human body when acted upon by external forces, such as gravity, inertia, or concussive blows.

After Half-Life

In addition to more sophisticated AI, real-world physics, new technology for facial expressions, body language, and lip-synching, *Half-Life 2*'s Source engine features drivable vehicles and a terrain generator. It also sports advanced displacement mapping technology—another boon for mod makers—which enables dynamic, fluid scenery elements such as water, sand, or snow to deform in real time.

Unfortunately, the engine is so revolutionary that Valve has already fallen victim to a major code theft by hackers eager to



Valve's powerful facial animation system uses 40 different muscles to control nearly every nuance of a character's expression, with the eyes, lips, and brows exhibiting the highest level of expressivity.

acquire the technology. While forcing Valve to delay the game's initial October 2003 release date until mid-March, the theft and continued assault by hackers are telltale signs that fans are bursting with anticipation for the sequel, not to mention a testament to the powerful hold the distinctive *Half-Life* narrative style has exerted over game players.

In attempting to trace the source of this power, *Half-Life* writer Marc Laidlaw points to the game's distinctive narrative structure, and its ability to transfer the same drama experienced by a passive observer into a medium where the audience is an active partici-

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pant in the story. "Games require a new way of looking at the concept of a 'dramatic moment,' because the meaning of drama is different for a passive observer than it is for an active participant," he says. "Structure is not something the actors in a story are usually aware of. That awareness is traditionally reserved for the audience. But for an actor in a game (the player), the moments when you perceive structure and realize that you're playing a significant part in assembling some larger pattern can be very compelling."

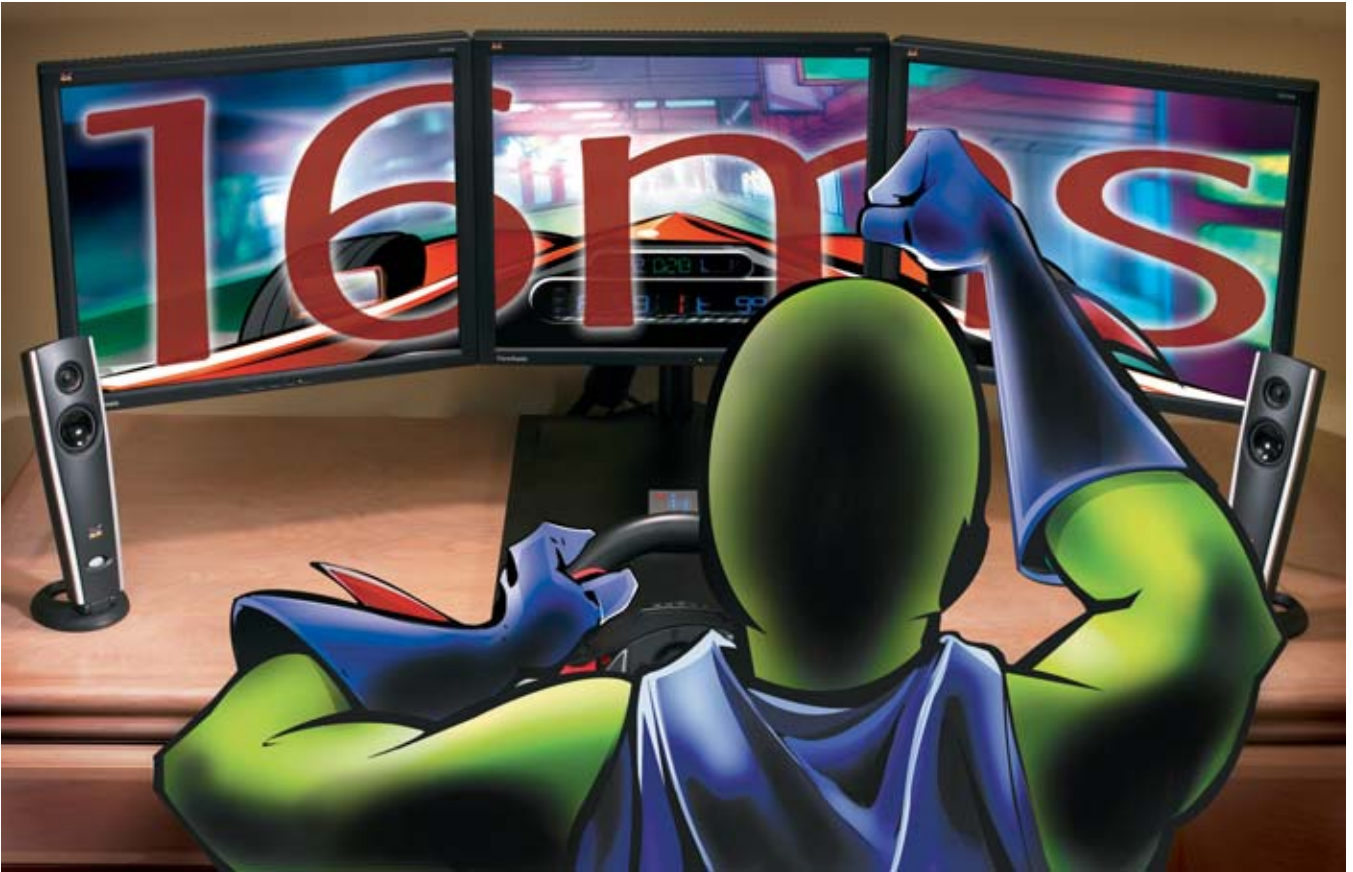
In fact, the narrative structure in the *Half-Life* games is there to support this experience, Laidlaw notes, and to provide opportunities for surprise and revelation that feel inevitable rather than random. "Ideally, when you are most involved in playing *Half-Life 2*, whether you're part of a scene with other actors, solving a puzzle, or fighting enemies, you not only feel challenged and fully engaged, you feel that it all means something," he says. Mastering the dichotomy of simultaneously participating in and perceiving the story structure may, therefore, be the key to unlocking untapped levels of emotional involvement in computer-game storytelling. And if Laidlaw and his teammates at Valve can achieve that goal with *Half-Life 2*, their pioneering efforts could put them on the cusp of the next era of gaming. ■■

Martin McEachern, a contributing editor for Computer Graphics World, can be reached at martin@globility.com.



The artists gave the characters, including Alyx, Freeman's sidekick throughout the game, a wide range of facial expressions.

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By Jenny Donelan

Linux

in the Chain

Production studios are using the free OS in all types of supporting roles

A few years ago, studios creating digital content for film and broadcast began adding Linux-based hardware and software to their production pipelines. An early, high-profile example was DreamWorks SKG, which used Linux-based applications in its feature-film pipeline for the first time back in 2001 on *Shrek*. At that time, animation studios large and small were either moving to Linux or considering such a move (see "Linux Invades Hollywood," *Computer Graphics World*, September 2001, pg. 38).

Three years later, the invasion looks more like a gentle assimilation—studios are using Linux to save money and bolster productivity, but, in most cases, they have not thrown away all their Irix and Windows boxes. They may be using Linux-based content-creation software, but not all their software is Linux-based. Linux may be the dominant OS in one part of the production pipeline, but it could scarcely exist in another.

Why hasn't Linux completely taken over the DCC environment? It's free, after all, and it's considered more stable than most commercially available operating systems, for which users pay sizable licensing fees. Moreover, as it is a version of Unix, Linux allows studios to port legacy code created under Unix or Irix (also a version of Unix) much more easily than does Windows.

Steady Adoption

Actually, many animation professionals would say that Linux is taking over, but not yet, and not everywhere. "The marketplace is finally getting to the point of—I won't say 'full maturity'—but it's far beyond where it was even a couple of years ago," says Patty Fry, global offering executive with IBM's Digital Media Group. Reasons for the slow but steady pace of adoption have as much to do with the marketplace and the nature of production houses as with the OS itself. "Initially," says Fry, "the market was slow to have sufficient graphics drivers to support Linux." Another gating factor was that companies that developed 3D applications weren't developing them for Linux.

Then there is the complexity of the operating system itself. A GUI shell for basic commands exists, but the main interface is the command line, which can be daunting to users accustomed to the point-and-click world of Windows. And because Linux is developed and supported on an ad-hoc basis, studios can't rely on one large company (such as Microsoft) to get their questions

answered. "If things don't work out the way you've planned," says Rob Hale, senior software developer for Mainframe Entertainment, "you have to be prepared to go through the open-source community to get help rather than placing a support call to your supplier."

For these reasons, Linux is currently fulfilling different roles in the pipeline de-



Barbie of Swan Lake is one of the first Barbie animations to be created by Mainframe Entertainment using the Linux OS.

Image courtesy Mainframe Entertainment.

pending on who's using it, where, and why. If you're a Maya house, for example, you might be using Alias Systems' Linux-based Maya to create content. Alias began porting its Maya product line to Linux four years ago, while Softimage began offering a Linux-based version of its content creation software in 2001. If you've always used Discreet's 3ds max, which, as a Windows-



Riot used a Linux version of Apple's Shake compositing program for the opening sequence of the movie *Peter Pan*.



based application, hasn't been ported to Linux, you won't be making that move now. Many studios are using Linux-based rendering servers, and it is here, in fact, that Linux first made its mark in the animation world, when the producers of *Titanic* used a Linux-based renderfarm in 1997. Here's a look at how some studios are using Linux today, and what their principals have discovered about its pros and cons.

Mainframe Entertainment

An example of a studio that has incorporated Linux on a wide scale is Mainframe Entertainment of Vancouver, British Columbia. Mainframe used a Linux/Irix renderfarm to produce the *Barbie as Rapunzel* video film for Mattel in 2002, and subsequently developed an entire Linux-based Softimage|XSI pipeline to create the Halloween TV special *Scary Godmother* this past fall (see "Witches Brew," *Computer Graphics World*, October 2003, pg. 30).

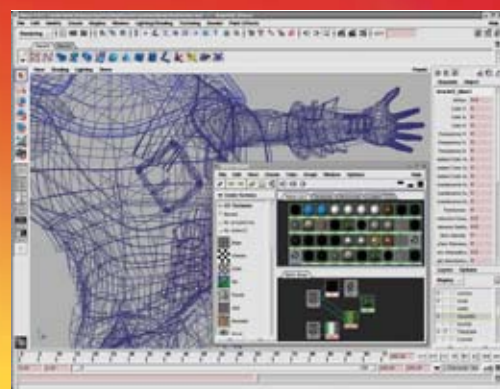
Mainframe began the move to Linux two years ago. Says Hale, "Our renderfarm was Irix-based SGI Onyx, Challenge, Octane, etc. Because of the reduced costs of a Linux box, it was apparent that a Linux renderfarm could be built much more cheaply. At roughly the same time, we did a study to determine the cost of converting our proprietary software to another platform. Because our software was initially developed on a Unix operating system, the

cost and time of converting to Windows was prohibitive, as opposed to converting to Linux." Hale notes that Mainframe has used a phase-in process for the conversion. At the start, approximately 10 percent of its machines were switched to Linux. That percentage has increased substantially, he says, and the studio's conversion process is still very active.

As far as Linux goes, the pros have outweighed the cons at Mainframe. "Linux has lived up to its promise as a much cheaper and faster graphics processing platform," says Hale. "Animators and modelers are more productive, and they spend less time waiting for scenes to render." Besides the aforementioned lack of formal support, lack of availability of Linux applications also has been a sticking point, according to Dave Fracchia, Mainframe's vice president of technology. Furthermore, he says, "many vendors that do support Linux provide features and updates to their software in a Windows-first, Linux-next fashion, so there is a lag in new features between the platforms."

Blur

Linux is entrenched in a different way at Blur animation studio in Venice, California. "We never had proprietary Irix," says Blur principal Duane Powell. Because Blur's desktop systems are Windows 2000-based, and because the studio uses



According to Alias Systems, the Linux version of its Maya software is used by a small but influential portion of the overall Maya user base.

Discreet's 3ds max as its main content creation tool, there has been no great impetus to switch to Linux thus far.

The back end of the pipeline is another story, however. "In 2000, there was something wrong with our server," says Powell. "It turned out to be the Code Red Virus." Frustrated with the vulnerability of its Windows-based servers, the company principals switched to Linux, a move Powell says they have not regretted. "It stays up; it doesn't quit."

"What Linux has done," Powell says, "is totally liberate the back end of the business. Everything in the back room—servers, Web, e-mail—depends on Linux." What does not depend on Linux at Blur is any of the animation processes, including rendering. But that will change, according to Powell, as additional products become available.

As for moving the back end to Linux, “it was a great decision,” Powell says. “A lot of people are afraid of the command line, but it’s not difficult to do anymore.”

Riot

The path to Linux doubles forward and backward at Riot in Santa Monica, California. But the studio could be a poster child for the state of Linux in animation. The company had already converted many of its render machines to Linux, so that the farm was about half Linux and half Windows boxes, according to visual effects supervisor Ken Nakada. But then it had to convert back to Windows because of one piece of incompatible software. The studio was all set to use Softimage|XSI and Maya under Linux, but it turned out that the XSI batchserve—a vital component—didn’t run in Linux at that time. So it returned to its former setup.

None of this seems to have discouraged the studio. Nakada says Riot is wholeheartedly behind Linux. “We recommend it,” he says. “We’re looking to go full-tilt Linux.”

The company has already used Apple’s Shake running on Linux, he notes, to help produce projects like the opening sequence for the film *Peter Pan*.



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More Linux Ahead

Each of the three studios mentioned here is using Linux in different ways, and to different degrees. But what each has in common is the plan to move forward with the free and flexible operating system, especially as software vendors make more of their products available for it.

Partly, the studios are following the lead of the high-profile houses, such as DreamWorks, that already are using Linux. Hardware vendors are reluctant to name names, but clearly the big production houses are the bellwethers. “The folks running on Linux may have 300, 400, or 500 programmers,” says Jeff Wood, director of product marketing for personal workstations at Hewlett-Packard, which helped lead the way in working with studios transitioning to Linux. The typical Linux customer for Maya, according to Jill Ramsay, senior Maya product manager for Alias Systems, is a large film production studio or effects facility. “Fewer than 10 percent of Maya seats [including Windows, Irix, and OS X] are on this platform,” says Ramsay. “But the importance of these Maya seats goes far beyond a mathematical percentage.” Avid/Softimage wouldn’t disclose what percentage of XSI seats

Left: Softimage|XSI for Linux is in use at medium- to large-size effects houses, according to Avid/Softimage.

Below: Apple’s Shake 3 compositing program runs on Linux and is optimized for the company’s 64-bit G5 processor.

are Linux-based, but “it has become a sound strategic point to support Linux,” says XSI product manager Jason Brynford-Jones.

Smaller studios aren’t just playing copycat, however. The real motivations for moving to

Linux are money and productivity. “Linux really does lend itself to higher production with lower resource requirements,” according to IBM’s Fry. “In fact, the heads of one of the major studios we work with have told us that their total cost of ownership reduction was in the 20 to 25 percent range. Also, it enabled them to hit animation milestones, within their budgets, while actually reducing their support requirements by about 40 to 50 percent and enabling them to increase their animators by the same amount.

“The bottom line,” says Fry, “is that Linux makes it possible for studios to make better animated features or special effects.” ■■

Jenny Donelan is a contributing editor to Computer Graphics World.

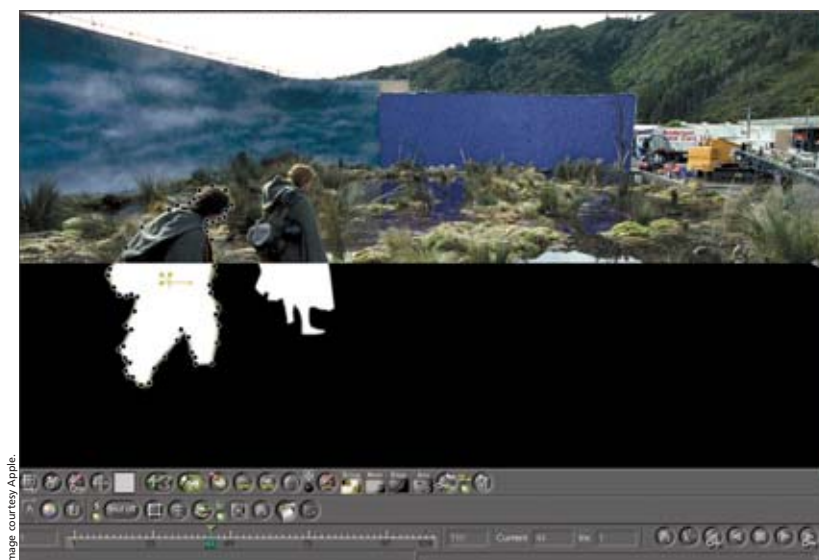


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Horsing Around



Film editors help
a donkey realize
its dream

By Karen Moltenbrey

A

lmost every little boy dreams of scoring the game-winning touchdown in the Super Bowl. During this year's big game, these youngsters weren't the only ones with huge ambitions.

In Budweiser's "Born a Donkey" commercial, which aired during the game, a lowly donkey dreams of one day walking hoof to hoof alongside the famous Clydesdales while driving the Budweiser beer wagon. Finally, with lots of hard work, determination—and post-production effects—the animal makes the world-famous team.

This humorous spot, which was voted the viewers' favorite during the fiercely competitive "ad bowl," is hardly considered a visual effects piece. While it appears as if everything was captured in camera, the truth is that the commercial required a





In the commercial, the donkey not only makes the Budweiser team, but is shown leading it. While compositing the donkey into the shot, the artists had to remove several of its training straps and reins without affecting the ornate signature harnesses.

tremendous amount of postproduction, compositing, and roto-scoping to achieve the desired result.

Whereas the donkey and the massive Clydesdales appear in many of the same shots, rarely were they filmed in close proximity to one another. In fact, the beginning sequence showing the donkey behind a fence in a field was the only one in which the animals were filmed together.

"Shooting with animals is difficult because they are so unpredictable," says John Myers, executive producer at Ring of Fire, the West Hollywood, California, effects studio responsible for the postproduction work. "But in this instance, the animal handlers were especially concerned for the safety of all the animals because of the size discrepancy between the donkey and the Clydesdales."

Ring of Fire, therefore, had to contend with a number of split-screen composites that placed the animals together, including the scene when the donkey walks into the barn to audition for the horses. To accomplish this, the group tracked the animals using 2d3's boujou camera-tracking

software, and used Discreet's combustion running on an Apple Power Mac G5 for prepping the mattes and finessing the shots.

When the donkey brays in this same sequence, the ears of all the Clydesdales move in unison. "We actually captured that in camera, but they all didn't move at the same time," says Myers. "So we went back and created isolated mattes, then tracked and composited the correct ear motions so the horses were responding to the noise simultaneously."

In addition, the team used combustion to remove guide wires, harnesses, and leather reins that were used on the set to keep the donkey in place. Yet, the editors had to be careful not to roto-scope out the ornate harnesses worn by the donkey in the end of the spot that match those worn by the famous horses.

Finally, to support director Jeff Goodby's (Goodby, Silverstein & Partners) vision of an ideal environment, the group did an overall color correction within inferno, adding golden light rays so the scenes would reflect the donkey's glorious vision.

So, is the donkey's grand achievement a reality or just part of the dream? "That's up to the viewer to decide," Myers notes. ##

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

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**For this scene, artists
integrated footage of the
donkey, added light rays,
color-corrected the shot,
and composited the correct
ear motions for the horses.**

ing software, and
composited them
using Discreet's in-
ferno running on an
SGI Onyx 2 work-
station. They also

64-Bit Players

New chips spell relief
from huge datasets

By Jenny Donelan

Momentum for 64-bit computing in the digital content creation arena has been building since AMD released its 64-bit Opteron chips last year. It's easy to figure out why: Special effects houses, game development studios, and other companies that create entertainment-based digital content are slaves to increasingly huge datasets, the result of the more complex and realistic graphics that audiences expect to see in movies, television programs, and games.

For the most part, servers and workstations based on the new 64-bit processors are able to whip through these datasets far more quickly than their 32-bit cousins. What this means to a film studio, for example, is that rendering can be accomplished much more quickly, thus speeding up production time, saving money, and also freeing up artists and their workstations so they have more time to spend creating and producing.

Yet, 64-bit processors are hardly new to the world of digital content creation. In fact, they used to outnumber 32-bit

processors at the high end of the ranks (think of 64-bit SGI machines running Irix at big-name special effects studios). But the new Opteron chips are different in two ways. First, they employ the standard x86 micro-processor architecture on which Pentiums and their Intel predecessors are built. This makes them relatively affordable and, more important, compatible with existing 32-bit operating systems and applications, which currently represent the bulk of DCC software.

Second, special features of the AMD chips' architecture enable those 32-bit applications to run natively, without performance degradation. Conversely, Intel's Itanium, which is also a

IBM plans to add Opteron-based machines to its IntelliStation line. The new A Pro series, at left, is scheduled to ship later this year.



64-bit processor, performs well as a base for high-end servers running 64-bit applications, but runs 32-bit applications in software emulation mode, which can hinder performance.

A Bit about Chips

The 64-bit chip's chief benefit to digital content creators is that it can address more memory—64 bits at a time—within the processor itself. A 32-bit processor can handle no more than 4GB at a one time, at which point it has to begin swapping out data to the hard drive, which slows processing speed.

Users, some of whose datasets now far exceed 4GB, refer to this as the 4GB “wall” or “barrier”—the point at which their content begins to be handled less efficiently. The 64-bit processor, on the other hand, can take on 16GB at a time, which allows for faster processing of those large datasets.

“The thing that we have been hearing most from our customers is, ‘I need more memory,’” says Matt Wineberg, worldwide marketing manager for IBM. “Having 16GB of memory, as opposed to 4GB, will greatly reduce rendering times.” Softimage|XSI product manager Jason Brynford-Jones echoes this sentiment: “We [audiences] need to see that much more detail in our films,” he says, noting that the data required to create that detail comes at a price in time, labor, and money. “And if 64-bit can handle it, companies will invest in it.”

As noted, part of what makes the Opteron chip appealing is its ability to run 32-bit applications natively. This means that digital content creators don't have to buy new 64-bit versions of their favorite applications (there are hardly any to buy now, anyway), and their 32-bit applications run as fast or faster than they do on 32-bit machines. The Opteron chip also features AMD's HyperTransport architecture, which enables seamless scalability for multiprocessing. Up to eight Opterons can be used to power a server, and up to four can run a workstation.

Other Players

AMD's Opteron is not the company's only 64-bit chip. AMD also makes the Athlon, which was introduced this past fall as the desktop counterpart to Opteron's workstation and server role. And many other machines in the DCC space are powered by other 64-bit chips. SGI, of course, has long been in the game, and now offers machines that run on the free Linux OS, as well as its proprietary Irix. SGI recently announced new models of its Linux-based Altix servers. And Apple's G5 uses a 64-bit processor.

Sun Microsystems is an example of a company that has produced its own 64-bit processors and workstations for many

years, and continues to do so. Sun released its first 64 bit-based technical workstation in 1996, according to Brian Healy, group marketing manager for Sun's workstations product group. Sun is mostly occupied with technical computing, he says, “though we're also involved in the DCC space.” Side Effects Software's Houdini, for example, runs on Sun's Solaris Unix-based operating system. Sun just introduced 64-bit workstations based on its UltraSparc processors that sell for less than \$5000—50 percent less than its previous comparable offering, accord-

ing to Healy. Regardless of whether this was prompted by AMD's offering, excitement over AMD's chips is probably good for all 64-bit players, says Healy. “I think it's going to hasten acceptance.”

The Softer Side

Sixty-four-bit technology is currently experiencing the “chicken-and-egg” syndrome common to new hardware and software architectures. Sure, the chips are fast and can handle lots of memory, but where are the applications that will actually make use of

them in the production pipeline? They're not here now because software vendors tend to be wary about diverting resources to produce new versions of products that may or may not ultimately have a big enough market to pay back their investments.

One of the advantages of Opteron, according to AMD, is that a lack of 64-bit applications doesn't matter, since 32-bit applications run natively on it. In fact, the company is confident that they run even faster than on 32-bit machines, although it's too early to say for sure because all the benchmarks aren't in yet.

Operating systems are the first concern. Here's where Linux, which is happy in a 32-bit or a 64-bit environment, comes into the picture. In fact, 64-bit computing and Linux generally are linked in people's minds. The newest version of Windows XP also runs on 64-bit, so clearly Microsoft has decided to back the technology.

In terms of the more specialized DCC applications, rendering seems to be the first line of attack. Mental Ray rendering software from Mental Images runs on the Opteron platform, not to mention Apple's G5 and just about every available 64-bit computing platform. And rendering within Side Effects' Houdini is optimized for IA-64 platforms as well. But that's about it for now. And though software vendors are cagey about their plans, they seem well-informed about what's going on with 64-bit computing.

Discreet, for example, has not announced a 64-bit native port of its flagship content creation application, 3ds max. “We have looked at and seen some success running in 32-bit mode on a 64-bit Windows processor,” contends Dan Prochazka, product manager for 3ds max, “which does not degrade performance and



AMD's Opteron chip, introduced last year, offers x86-based 64-bit technology for DCC workstations and servers.



Some vendors already have rolled out 64-bit units for the DCC market. At left is an AMD-based system from Monarch Computer. At right is an Opteron-based unit from Boxx Technologies, which has a relatively long history of using AMD chips in its systems.



allows us access to quite a bit more RAM—not as much as a native 64-bit application, but still quite a bit more.”

Softimage’s Brynford-Jones says he can’t comment on whether the company is porting XSI to 64 bit, but says he believes the technology is bound to take off. A spokesperson for Alias Systems says it is paying attention to developments in 64-bit computing, but has no announcements regarding it at this time. A few years ago, Alias demonstrated a prototype 64-bit Maya but didn’t bring it to market for “a variety of reasons,” so presumably the company has already done some of the legwork.

A Hardware Issue

Hardware vendors, which get to sell new boxes with new chips, are understandably more bullish on the subject of 64-bit computing than are software vendors. Sixty-four-bit machines designed for DCC applications are available from a wide variety

of systems vendors. Besides Hewlett-Packard, IBM, and Sun, 64-bit systems, most of them AMD-based, are available from Alienware, Boxx Technologies, Monarch Computer, Microway, QSol, and RackSaver, to name but a few.

Boxx sells workstations and servers based on AMD’s Opteron. Tim Lawrence, a Boxx founder and current vice president of operations, says, “Proprietary workstations based on 64-bit went away, not because of [any flaw in] 64-bit [technology], but because of the expense. So everyone was kind of stuck with 32-bit. Now, finally, we have a choice between 32 and 64.”

At Monarch Computer, which sells Linux-based servers and workstations built on both Opteron and Athlon chips, director of marketing Trey Harris says he has customers currently using 64-bit machines to do animation, 3D effects, video editing, and computer design. “Most of these customers are still using 32-bit software,” he says, “but the Opteron and Athlon 64 perform well in 32-bit mode.”

Full-speed ahead is not quite how Harris would describe DCC acceptance of 64-bit computing, however. “In my experience, most DCC customers are not early adopters, despite the technical demands of their applications. Intel [32-bit] and Macintosh are so heavily entrenched that it can be difficult to convince a DCC customer that the performance advantages of the new platform outweigh the risks involved in trying new technology. Most of these customers don’t want to bother with additional configurations and troubleshooting if something doesn’t work. Time is money to them, so they typically will wait for a second generation before adopting any technology to avoid hassles involved in the transition.”

On the Brink

For now, most AMD-based 64-bit servers and workstations are finding their DCC berths in rendering departments. Here, their massive data-moving capabilities offer immediate aid to people who render large, detailed imagery for a living. Most experts think that in a couple years’ time, most digital artists will be modeling and animating on 64-bit workstations using 64-bit applications as well. But at present, hardware vendors must wait for software vendors, and their customers, to make that leap of faith. ■

Jenny Donelan is a contributing editor for Computer Graphics World.

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Clockwise from top left:

Taxi 2000 This visual effects project by Vance Palodichuck and Zach Mandt from the Minnesota campus simulates a mass-transit concept for client The Starting Line Foundation. The students used Maya, combustion, Photoshop, and After Effects.

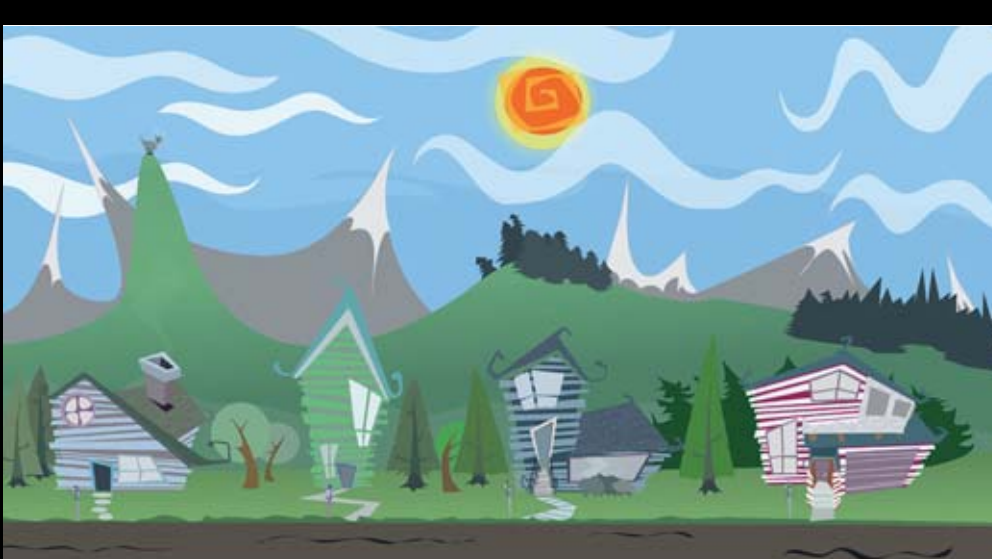
Sprint Project This project by Jared Coles and James Van Arsdale III from the Philadelphia campus is a CD-ROM Flash presentation of photos taken with a Sprint cell phone camera.

Invitation This Flash-based invitation, one of several compiled by various students, including project manager Zach Pergament from the Philadelphia campus, were e-mailed to potential employers to announce a portfolio review showcasing the students' works.

Canyon This landscape project was created by Shiew Yeu Loh from the San Francisco campus for studying outdoor lighting and texturing.

When eager students began their education at The Art Institutes, they no doubt had visions of creating the next *Finding Nemo* or *The Lord of the Rings* movie. While such dreams may seem overly ambitious, they may not be out of reach. In fact, 14 of the 52 projects selected for last year's SIGGRAPH Electronic Theater were student works—which was an impressive showing for "artists in training."

Students arrive with fresh ideas, enthusiasm, and a willingness to absorb all they can, but it's up to the instructors to nurture these dreams and turn raw talent into professional skills. Aiding the instructors in this endeavor at The Art Institutes is Hewlett-Packard,



whose 3500 entry-level and mid-range Windows-based Pentium/Xeon graphics workstations are used 16 hours a day at the school's campuses across the US. With the equipment, more than 20,000 students at The Art Institutes create illustrations, animations, and Web designs.

HP also works with The Art Institutes and other art schools and universities outside the classroom by showcasing student projects at major industry trade shows, including NAB.

A current selection of student projects from The Art Institutes appears on these two pages. —Karen Moltenbrey

Clockwise from top left:

TBB2 This music video project by Mitchell Loidolt from the school's Minnesota campus was created for the Teddy Bear Band, a group of local musicians whose main audience comprises children. The video was created in combustion, Illustrator, After Effects, Photoshop, and 3ds max.

Old Man This image is one of several created by Shiew Yeu Loh for an animation pre-production class at the school's San Francisco campus. Created in Maya and Photoshop, the model was a texturing challenge, requiring the student to combine nine color maps into one shader so it would interact properly with the lighting. Not only did this provide a subsurface scattering effect, but it also made the character's skin look moist.

Golden Gate Theater series These images, part of Shiew Yeu Loh's texture study for a class at the school's San Francisco campus, uses the historic Golden Gate Theater building as a reference for the photorealistic digital models, created in Maya and Photoshop.

SketchBook Pro

Alias Systems' unique software tool streamlines the creative work flow

By Chris Hipp

An illustrator by trade, I implement digital tools, as well as traditional pencil and paper, in my daily work flow. So when Alias announced its SketchBook Pro, I jumped at the opportunity to add it to my arsenal of tools. Before SketchBook Pro, I started projects with pencil on paper, sketching out rough ideas. When I created an image I wanted to translate into the digital realm, I scanned it. Once it was digital, I added color and other embellishments.

In a short time, SketchBook Pro changed my work flow by replacing pencil and paper. It enabled me to add color right from the very first stage, a practice that I normally didn't do with sketches on paper. And I could change colors quickly and easily.

I did find myself thinking of it as a sketchbook, as opposed to a handheld way to fine-tune and create finished images and material. I used SketchBook Pro to create a rough sketch that I later would finish on my workstation. And, considering it is loaded on a portable Tablet PC, it holds great potential for working remotely. It might be nice to have when I'm traveling, enabling me to sketch the instant that inspiration strikes. I might even e-mail sketches to the office or my client when I'm in the field. And I could sketch during meetings, either to make notes on a pre-existing piece of art or to create something based on ideas being exchanged.

I often used SketchBook Pro's screen-shot utility, which is always available on

the toolbar at the bottom of the screen. I just click the camera on the right-hand side of the toolbar and it takes a picture of the entire desktop and launches the resulting image file in SketchBook Pro. At the same time, it sets the image layer as a locked background and provides me an active layer on top of it. I can start right in, making annotations. I use that utility often and think it's a very good idea.

Although I use my Wacom tablet extensively, this marked my first experience sketching directly on an LCD. I had to get used to hardware limitations. Assigning color can be difficult because we all see the screen differently. Colors can look very different when I reposition the LCD only slightly. As a result, it is hard to be confident that the colors I pick are accurate.

I would have liked a selection tool that offers more detailed options than a rectangle. I am accustomed to having a detailed lasso selection tool with which to select a certain part of my sketch. I was drawing a face, and I liked the nose but thought that it should have been higher. I didn't want to erase it and redraw it; I just wanted to grab it and move it. That's something I often do when I'm sketching, and I couldn't find a way to do that with SketchBook Pro's rectangular selection tool.

In addition to the lasso selection tool, I wanted the ability to scale a portion of my illustration. Inevitably, I always find myself wanting to pick a small part of my sketch and scale it. I did not have a way to do that, yet it seems like a natural feature for a sketching program.

Two erasers are provided: one at the other end of the pen stylus and a standard eraser option. The regular eraser tool

can be modified, for instance, in terms of size and opacity, and saved as a preset. I could not customize the default eraser on the end of the stylus, however. I would have liked to be able to flip the pen over and use my favorite eraser, which is very small and pressure sensitive. Instead, only one large eraser is offered at the end of the stylus.

Given the availability of multiple undo, I wasn't afraid to experiment with my sketches and, in turn, did not have to limit my creativity. I also enjoyed the availability of layers in SketchBook Pro. To trace portions of an image, I simply would bring in a photo and put an active layer above it as tracing paper. I could name and rename the layers, writing in the titles with the pen stylus. It is a nice way of keep everything stylus-controlled. I thought that I would find myself wanting to use the control keys, as I usually do. But the tools seem to be designed in such a way that it limits the desire and need to use the keyboard.

Suitable for use with Tablet PCs and Wacom pressure-sensitive tablets, the software responds quickly to the stylus. The pen-based interface and marking menus are well done. Additionally, I had the option of saving files in such popular formats as TIFF, BMP, JPG, GIFF, and PNG. Overall, I was very happy to have this tool with which to sketch. It's not only efficient, but also a lot of fun to use. ■■

Chris Hipp is a professional illustrator well versed in a wide variety of digital imaging solutions.



Image by Mark Behm

High-quality images are possible with Alias Systems' SketchBook Pro software solution.

SketchBook Pro

Price: \$179

Minimum System Requirements:

A Tablet PC or a workstation with a 266MHz Intel Pentium II or greater processor, Windows XP or Windows 2000 only, 128MB of memory, a 16-bit color display, and a pressure-sensitive Wacom tablet and pen stylus.

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Magic Bullet Suite

Red Giant Software develops a suite of solutions for customizing video

By David Singer

I was a longtime subscriber to the belief that film is film, video is video, and you can't make video look like film. That changed the day I met Magic Bullet Suite. The program provides a creative environment in which to customize footage for output to DVD, TV, or film. To accomplish this, Magic Bullet Suite offers a series of tools through an accessible and intuitive front end that, in turn, is accessed via Adobe After Effects Version 5.5 or above.

Magic Bullet Suite includes five tools: Magic Bullet, Looks Suite, Opticals, Letterbox, and Broadcast Spec. Together, these tools enable you to take original high-quality DV footage and de-interlace (remove the "jaggies" in interlaced footage) and de-artifact (smooth out imperfections in digital video), convert to 24 frames per second, apply creative looks, prep for a film-recording facility, and ensure compliance with industry standards for broadcast TV.

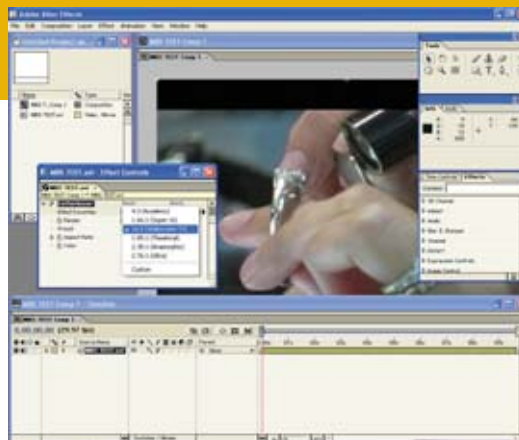
Magic Bullet is designed to convert interlaced footage to 24p, as well as to de-interlace and de-artifact—all of which it does extremely well. While in After Effects, you open a New Project and import footage. Then open the Interpret Footage window, deselect Separate Fields, and make sure your aspect ratio is set correctly. Next, drag your project to Create Comp, open the Settings window, and change the frame rate to 23.976. Then, in the Effect tab, select Magic Bullet.

At this point, you'll be presented a pop-up window with an Auto Set-up button.

When selected, the button will check and verify your comp settings and confirm that you are configured to convert the footage. Next, you're presented with the options to de-interlace, where you'll have control over Field Order (upper or lower first), Motion Detection Adjustments, and Detail Pattern Size. Here, you'll also choose whether to de-artifact. Add your project to the Render Cue, check your settings, click Render, and be prepared to wait.

A 20-minute test file being converted to 24p with De-interlace and De-artifact selected would take nearly 11 hours to process on a 2.26GHz Pentium 4 system with 768MB of PC800 RDRAM. If you're not going to convert to 24p and only want to de-interlace and de-artifact, you can expect much faster performance. De-interlacing and de-artifacting the same test file, without converting, cut the render time to four hours. If you're just looking to de-interlace or de-artifact, less expensive solutions will provide acceptable results in about the same amount of time; but, it's the quality of the finished output and the total solution that makes Magic Bullet Suite worthwhile and worth the price.

The Looks Suite tool is the true beauty of Magic Bullet Suite. Here, you can choose to apply a variety of looks designed to emulate those achieved through film processes and treatments commonly used in movies and television, such as Bleach Bypass, Color Reversal, Sepia, and others. You also can design your own. Magic Bullet Suite includes enough options—more than 30 presets—to cover most situations. The time saved using presets can cover the cost of the entire suite.



Magic Bullet Suite provides video professionals several tools, each with its own intuitive interface.

The remaining tools in the Magic Bullet Suite tool box include Opticals, Letterbox, and Broadcast Spec. Opticals enables you to mimic film-like fades, burns, and dissolves, whereas Letterbox helps you crop your project to the aspect you desire, whether 4:3, 1.66:1 (Super16), 16:9 (Wide-screen TV), 2.35:1 (Anamorphic), 1.85:1 (Theatrical), and 2.76:1 (Ultra). Broadcast Spec is the last step in the process and one that adjusts your project to create broadcast safe or legal color and luminance values.

With Magic Bullet Suite, you can come closer than ever to that elusive film look, so close in fact, that many people will believe that you shot 35mm film. Yet, the results you'll get with these tools, like others, depend entirely on what you start with. If you feed Magic Bullet Suite poorly framed, poorly lit, low-resolution footage, then you're not going to get what you want out of it. But if you feed Magic Bullet Suite quality source material, you'll be amazed with the results. But be prepared for long rendering times. The more you ask Magic Bullet Suite to do, the longer it will take. But, even so, Magic Bullet Suite should be required software for any studio.

Magic Bullet Suite is available in two versions: SD supports standard NTSC and PAL formats, and HD supports all resolutions supported by After Effects, including high-def formats (1280x720 and 1920x1080). ■

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

Magic Bullet Suite

Price: \$995 (SD) or \$1995 (HD)

Minimum System Requirements: Adobe After Effects 5.5 or later, 256MB of RAM, and Mac OS 9.2 or higher or Windows 2000 or XP

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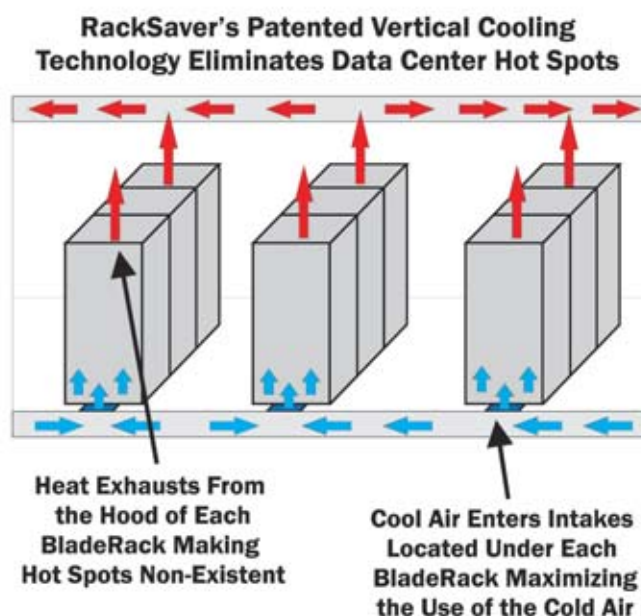
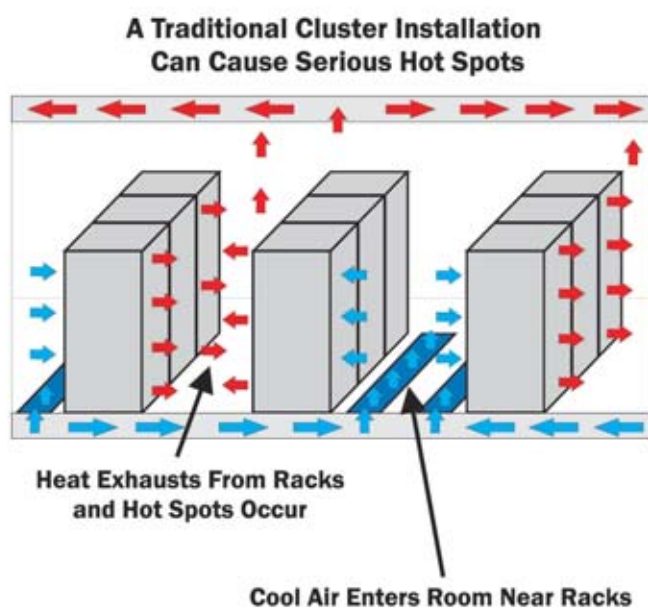
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GameBoxx FX

Boxx delivers a solid, powerful gaming system

By George Maestri

Boxx Technologies has made a solid name for itself in the production community by creating reliable servers and high-end workstations at an affordable price. The GameBoxx series is no different. The GameBoxx is a fast and powerful machine targeted at people who perform high-end tasks, such as intense gameplay, game development, and digital media creation.

Like other Boxx machines, the GameBoxx is wonderfully built. The case is made of metal, including the front panel, which is bright red (blue, orange, black, and silver also are available). The system is lightweight, yet solid. The front of the machine contains two USB, one FireWire, and audio connectors. On the back is another FireWire connector, along with audio, four more USB slots, and a 10/100 Ethernet port. Boxx used the new Superbright LEDs for the front panel power and drive lights. While these certainly look cool, I found the LEDs so bright as to be distracting.

The case is held together by thumbscrews, enabling tool-free maintenance. The machine opens by sliding off the side panel. The first thing I noticed is that Boxx has taken the effort to tie down and properly route all the internal cables, making the guts of the machine very tidy indeed. The machine has a hefty 530-watt power supply, which should allow for a lot of expansion. There are plenty of fans to keep the interior cool, but the machine still manages to remain whisper quiet.

Boxx's GameBoxx FX model sports the AMD Athlon 64 FX-51 CPU with an Nvidia Nforce3-based motherboard. Memory is 1GB of fast DDR memory with ECC error correction.

Memory speed clocked in at a lightning fast 5660MB/sec. Like the Opteron, the Athlon 64 FX is a 64-bit chip with full support for 32-bit applications. A quick 32-bit Sandra test of the CPU gave a speed of 9099 MIPs and a floating-point score of 4486 Mflops. The integer score is equivalent to a high-end Pentium 4, although the floating-point scores fall a bit short. These are 32-bit tests, so being a true 64-bit chip means that the Athlon 64 will give you an extra performance boost once applications migrate to 64-bit code.

The machine is expandable, with six internal 3.5-inch drive bays, as well as four external 5.25-inch bays. I liked the fact that the internal bays were oriented so the drive cables faced outward; it will make servicing the drives extremely easy. The motherboard supports Serial ATA and standard IDE drives.

The GameBoxx FX is the first machine I've seen with a serial ATA drive. The Serial ATA standard uses a much thinner cable and is considerably faster than the standard 40-wire IDE drives. The 36GB drive runs at 10,000 RPM, which provides a performance boost over 7200 RPM drives. A quick test of the drive using Sandra pegged the speed at 33,490KB/sec., which is similar to high-end SCSI 320 speeds.

The graphics card is an ATI Radeon 9800XT, a fast 256MB card geared for gaming. Boxx offers a few other consumer-level ATI graphics cards in the lineup, as well as a few Nvidia boards. In a nod to the gaming world, I ran a 3Dmark, which produced a

score of 12,631. Running Viewperf, the standard OpenGL test, however, revealed a 3ds max score of 13.70 and a Pro-E score of 15.33. While good, these scores are below those of the high-end ATI FireGL and Nvidia Quadro cards. Those who use high-end 3D authoring packages and need the extra speed might want to consider going with Boxx's 3DBoxx machines, which sport high-end cards from ATI and Nvidia.

Of course, benchmarks are only one part of the story. I tested the machine against a number of applications, including Discreet's 3ds max and Adobe's After Effects and Photoshop. Application performance was very good, and I had no serious issues with any of the packages. As concerns gameplay on the machine, it gets two thumbs up. Resolution and playback speed were excellent, and again no compatibility issues arose.

Overall, I like the GameBoxx FX. It is solidly built, attractive, and fast. I am sure any serious gamer would love the machine. At a price of almost \$3,000, it's not for the timid. Still, this workstation is not just for gamers. With the right video card, I can certainly see it fitting nicely into a production environment. The fast Serial ATA drives and FireWire capabilities make it a capable video machine, and the GameBoxx is certainly fast enough for 3D authoring as well. ■■

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



The GameBoxx, offered in various eye-catching colors, is a robust workstation targeted at the game-development and game-enthusiast communities.

GameBoxx FX

Price:

\$2924 as configured

Minimum System Requirements:
Not Applicable

Boxx Technologies
www.boxxtech.com
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Anark; www.anark.com

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SIMULATION

Adding Clothfx

Win Turbo Squid announced that Stitch has been updated as a Discreet Certified 3ds max plug-in called clothfx. A cloth simulation system for 3ds max, clothfx assists users in creating realistic fabrics and tailored clothing for digital characters and creatures. In fact, professionals have the option of applying the clothfx modifier to objects modeled in 3ds max that represent cloth or designing virtual clothing patterns and stitching together virtual panels into a complete garment.

STOCK OPTIONS

All Greek to Me

Art Recon debuted a new version of its *Recon3D Content Collections Vol. 1 Greek and Roman Art* and *Vol. 2 Medieval Art*. Revised and redesigned, both volumes are configured to provide professionals with photo-quality digital imaging, saving them significant time in the creation of virtual environments. Whereas *Vol. 1* includes Minoan, Doric, Ionic, Corinthian, and Tuscan styles, *Vol. 2* houses Romanesque and Gothic styles. Spanning five CDs, the two volumes together offer more than 650 3D objects in 3ds, 3dm, dxf, lwo, and obj formats. *Recon3D Content Collections Vol. 1* and *Vol. 2* each carry a single license fee of \$249; however, both volumes can be purchased in a bundle at a price of \$449.

Art Recon; www.artrecon.com

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ment. Clothfx includes more than a dozen preset cloth types, including silk, wool, and cotton, and is priced at \$595.

Turbo Squid; www.turbosquid.com

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MIDDLEWARE

Game Physics

Win Criterion Software has made available RenderWare Physics as a stand-alone application or as a component of the RenderWare Platform. The new release provides the game development community not only realistic, multi-platform physics modeling, but also the ability to add real-time behavior to game objects with enhanced rag-doll and rigid-body dynamics.

Criterion Software; www.csl.com

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MODELING

Buy the Farm

Win • Mac • Linux • Irix The Pixel Farm has introduced its new image-based modeling application, PFBarn 1.0. Targeted at the game development and CG previsualization industries, PFBarn enables users to place geometry, reconstruct meshes, and extract, map, and rebuild textures from 2D still or moving sources. Users can import



data from PFTrack and PFMATCH to build 3D environments. Its image modeling algorithms calculate camera perspective and movement, and then match them to any placed geometry. PFBarn requires only a single image or sequence, although it accommodates single or multiple sources. Able to match the geometrical characteristics of a background, PFBarn can extract texture information from an image and map it to the geometry. PFBarn 1.0 is priced at \$750 and is available bundled with PFMATCH at a cost of \$1700.

The Pixel Farm; www.thepixelfarm.co.uk
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HARDWARE

MOTION CAPTURE

Polhemus' Patriot

Polhemus has amended its line of 6 Degree of Freedom (6-DOF) motion capture, track-



events

APRIL

17-22

NAB2004, held in Las Vegas. Contact National Association of Broadcasters, www.nab.org.

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12-15

Macworld Conference & Expo Boston 2004, held in Boston, MA. Contact 508-743-0107 or www.macworldexpo.com.

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8-12

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

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Polhemus; www.polhemus.com

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GRAPHICS CARD

Feeding Multiple Displays

Nvidia unveiled its Quadro NVS 280 PCI, a 2D graphics board designed for multi-display applications. Nvidia's latest release comes bundled with the company's Unified Driver Architecture (UDA) and nView multi-display desktop and application management software. The Nvidia Quadro NVS 280 PCI, able to function as the main graphics head for PCI-only systems or in conjunction with other PCI and AGP 8X boards, can drive up to 16 high-resolution digital flat-panel displays from a single computer. The new dual-head graphics board incorporates a single, high-density DMS-59 connector for dual-analog and 1600x1200-resolution digital flat panels. PNY also is selling the Nvidia Quadro NVS 280 PCI in the US and Europe.

Nvidia; www.nvidia.com

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TRAINING

Calling Game Developers

Desktop Images has announced the availability of two new training DVDs for the creative community: *Texturing Concepts* and *Texturing Details*. Well suited to game-development professionals, the two new tutorial titles feature Christian Bradley, a freelance model, texture, and animation artist in the PC/console game industry. *Texturing Concepts* instructs viewers on creating and modifying textures with Adobe

BOOK CORNER

FLASH FUNCTIONALITY

Sybex introduces *Flash MX 2004 Savvy*, a new book covering both the Standard and Professional versions of Macromedia's Flash MX 2004. The text employs hands-on tutorials to explore the many digital content creation tools and nuances of the latest Flash release. Designers learn to use Flash to create compelling Web sites populated with animation, audio, and effects, whereas developers learn to build advanced Web applications with Flash through scripting, forms, and server-side connectivity. The book, accompanied by a CD, is priced at \$44.99.

Sybex; www.sybex.com

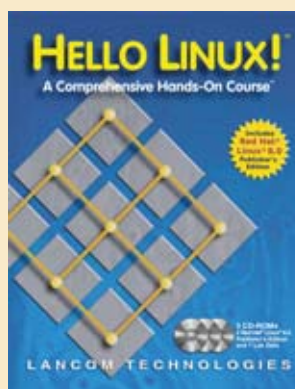
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VFX TEXT

Charles River Media announces the release of *3ds max 6 Animation and Visual Effects Techniques* by Sanford Kennedy, author, animator, and designer. The book details the new and enhanced features in 3ds max 6 and provides tutorials on the modeling of buildings, environments, humans, and aliens. Next, animation techniques—including character setup with bones, lip sync, facial expression, and walk cycles—are discussed. Also explored are detail lighting and rendering features, such as radiosity and global illumination, skylight and light tracer, visual effects lighting, and network rendering. Kennedy's *3ds max 6 Animation and Visual Effects Techniques* is offered at a price of \$49.95.

Charles River Media; www.charlesriver.com

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LEARNING ABOUT LINUX

Lancom Technologies has made available a comprehensive course on Linux: *Hello Linux!* A new, 1020-page book, *Hello Linux!* serves as a step-by-step introductory companion and reference for all professionals working with the Linux operating system. Roughly 300 pages provide the reader with hands-on exercises or labs. Also included with the text are the Linux OS on two CDs and lab data files on a single CD. *Hello Linux!* is now available at a cost of \$99.95.

Lancom Technologies; www.lancom-tech.com

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Photoshop, whereas *Texturing Details* offers techniques for adding realism and depth to any texture. Among the topics discussed are borders, grunge effects, custom brushes, texture sets, and lighting effects. Complete with project files, *Texturing Concepts* and *Texturing Details* each are priced at \$59.95.

Desktop Images; www.desktopimages.com

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VIDEO EDITING

Adding Artbeats

Customers who purchase Matrox Video Products Group's Matrox RT.X100 Xtreme Pro real-time editing solution also will receive five free Artbeats clips. In addition to the Artbeats clips, customers can select one free clip that retails for \$149 from Artbeats' stock

footage library and receive a 50-percent discount on a collection of their choice priced at \$229 or more. Those purchasing Matrox RT.X100 Xtreme Pro will receive a CD containing five DV clips from the following Artbeats collections: *Cloud Fly-Thrus 1*, *Kids of Summer*, *Light Alchemy*, *ReelFire 2*, and *Timelapse Landscapes 2*.

Matrox Graphics; www.matrox.com/video
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MISC.

CALL FOR ENTRIES

3D Mobile Gaming

Together with Nokia, Orange, Intel, IBM, In-Fusio, Criterion, Ideaworks3D, Fathammer, Nvidia, and Kaolink, Discreet has unveiled the first international 3D mobile gaming competition. Launched during

Imagina 2004 last month, the international competition targets independent mobile gaming artists and developers, traditional PC/console game developers, and 3D freelance artists. Designed to drive 3D mobile game development, the contest divides 3D and 2.5D mobile gaming submissions into two main categories: downloadable and non-downloadable. Entries should exploit the cutting-edge technologies and gaming hardware of high-end, next-generation phones, the Nokia N-Gage Platform, and Java phones. The deadline for registration is March 31. For information and to register, visit www.3dmobilegamingcontest.com.

Discreet; www.discreet.com

Savannah Showcase

Georgia's Savannah College of Art and Design has announced the 2004 Savannah Film Festival, to be held from October 23 to

30. For the festival, the college has issued a call for entries to filmmakers around the world. The competition's categories are: Animation, Documentary Feature and Short, Narrative Feature and Short, and Student. The deadline for entries is July 1. For details and an entry form, visit www.scad.edu/filmfest.

Savannah College of Art and Design;
www.scad.edu

Alias Announcement

Alias Systems has partnered with Hewlett-Packard and Gnomon 3D with the launch of the first Maya Personal Learning Edition Contest. Open to computer graphics industry professionals, students, and hobbyists, the contest requires entrants to download a free rigged character from the Alias community Web site, and animate, texture, and pose it. The new competition ends on April 28.

Alias; www.alias.com/community/contest

showcase



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Art by Jung-seung Hong, Recent Graduate, ILM Modeler

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