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ComputerGraphics

WORLD

October 2005 www.cgw.com

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Web story exclusives:

Digital Intermediates: The Future Unfolds

DIs are becoming an integral part of the production pipeline, but how will they streamline processes in the future?

DIs Made for You

The newest developments in commercially available digital intermediate solutions.

The 64-Bit Climb

Growth in the DCC market continues as 64-bit hardware and software slowly take hold. See what the future holds and what it means for you.

Smooth Moves

NaturalMotion's Endorphin 2.5, released this month, offers sports game developers an alternative to mocap.

See www.cgw.com for a more in-depth version of this article.

On the cover:

In EA's *NBA Live 06*, the virtual athletes display the same powerhouse moves as their real-life counterparts. See pg. 15.



Kelly Dove
Editor-in-Chief

Caught in the Game

Whatever happened to *Pong*? As a child of the '70s, I remember seeing *Pong*, on the Atari Game System, for the very first time at my neighbor's house. All it took was a few spins of the dial and blips of the paddle, and I was hooked. Who needed Saturday morning cartoons? *Pong* was much more entertaining. Before long, the neighbors kicked me out, and I faced a much bigger challenge—convincing my parents that we needed a *Pong* of our very own. The undertaking was bigger than I imagined, but eventually my parents gave in and bought me “the blasted” game. The kids in our neighborhood would gather together on the weekends for *Pong*-a-thons. We'd play for hours on end, hanging on every hit of the paddle, every bounce of the little white square. Competition was fierce. And even though it was a simple game with uncomplicated graphics and no special effects, it was our first encounter with sports-like video games, and we were consumed—until, of course, something better came along.

Today game developers rely heavily on CG artistry and specialized programming to deliver ultrarealistic, robust gameplay on all types of devices. The big-money business of sports games, for example, continues to blur the lines of creativity and technology as game developers and publishers push to drive profitability and exceed customer expectations. This month in “The Art of the Deal” (pg. 15), Martin McEachern explores the behind-the-scenes battles game developers and publishers encounter when producing sports games. From repurposing content and reducing polygon counts to integrating motion capture and AI programming, streamlining the production pipeline is paramount for success. Visual effects artists, who once saw their futures firmly entrenched in the movie industry, are now bringing their talents to the interactive game development community. And cinematic effects and camera angles, once reserved for game promos, are now becoming an integral part of the game.

Streamlining productivity, defining standards, and staying on budget are real challenges for game developers.

But, continued growth in the game development and publishing communities could easily be thwarted by a lack of open standards for file exchange. In the article “Collada: Game On” (pg. 10), Kathleen Maher discusses the advancements in Collaborative Design Activity, or Collada, an XML schema created by Sony that offers game developers a way to losslessly exchange data between authoring tools. Now a part of the Khronos open standards movement, Collada incorporates the collective trust of many game developers, software companies, and hardware companies, such as Alias, Autodesk Media and Entertainment, Softimage, Nvidia, ATI, and 3Dlabs.

Tomb Raider with Lara Croft helped jump-start the crossover of video games to the silver screen. Now companies like MTV Films are cashing in on the trend, recently announcing plans to acquire the worldwide film rights to the action-horror video game *The Suffering: Ties That Bind*, from Surreal Software, a Midway Games subsidiary. Together with Stan Winston Productions and Circle of Confusion, MTV plans to make the small-screen terror a larger-than-life movie.

As the game development and CG communities come together to immerse our reality with fantasy, the opportunity to get caught in the game is very real.

Are you ready? ■■

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VIDEO

PRODUCTS

Autodesk Announces Software Upgrades

Autodesk Media and Entertainment has unveiled upgraded versions of its video editing and visual effects tools.

The company's SGI IRIX-based Discreet Fire 7.0 and Discreet Smoke

7.0 editing systems, and Discreet Inferno 6.5 and Discreet Flame 9.5 visual effects programs, boast a new 64-bit architecture, enabling access to increased memory and improved interactivity with higher-resolution, multi-layered imagery.

Smoke 7.0 and Fire 7.0 have been upgraded with a new Timewarp feature that employs the company's proprietary motion analysis technology,

a new color-correction user interface, Clip History, and DPX keycode support.

Inferno 6.5, Flame 9.5, and Flint 9.5 offer a high-resolution paint system with support for layer-based graphics and Motion Estimation Timewarp for slow-motion and speed-up effects. The Lustre 2.6 digital color-grading system features a new editorial metadata architecture and subsystem, improved linear-mode primary color correction, XML-based cut files, and such collaboration enhancements as new integrated notes and an expanded flags system.

—Courtney E. Howard



MODELING / ANIMATION

PRODUCTS

Softimage Ships XSI Version 5.0

A subsidiary of Avid Technology, Softimage has debuted Version 5.0 of its XSI 3D animation software, capable of running on 32-bit and 64-bit CPUs.

With the release of Version 5.0, Softimage re-architected XSI to take advantage of the increased power, speed, throughput, and physical memory offered by dual-core 64-bit systems. The upgraded software also boasts a number of new features, such as the integration of the AGEIA physX physics-simulation



Image courtesy Softimage Co. and Avid Technology Inc.

engine and support for the importation and exportation of the dot-XSI Version 5.0 file format.

The new Ultimapper map-generation tool lends to cinema-quality maps, and the Gator property-transfer system helps merge textured and animated 3D models. XSI Advanced gains a new XSI Hair grooming tool and Syflex 3 advanced cloth simulation. Now shipping, Softimage

XSI 5.0 Foundation, Essentials, and Advanced are priced at \$495, \$1995, and \$6995, respectively. —CEH

MODELING / ANIMATION

PRODUCTS

Maxon Debuts Cinema 4D Release 9.5

Maxon Computer has upgraded its Cinema 4D and BodyPaint 3D programs.

Now shipping, Cinema 4D Release 9.5 incorporates more than 50 new features and enhancements that focus on lighting, rendering, and work flow. Lighting setup is easier and more flex-

ible, with lights that can take on virtually any shape. Area shadows and area lights now render up to four times faster than in previous releases. For creating textures, normal maps, and UVs, Cinema 4D's Baker has been reworked to provide results faster and with less effort.



A new Content Browser presents an overview of projects and available presets, while full-screen mode maximizes the work space. Users have the option of outputting 32-bit HDRI or OpenEXR files, as well as saving multipass renderings as compositing files for use in Apple's Shake. At the same time, Cinema 4D's Advanced Render module

gains two new tools. Sky is designed to aid users in the creation of high-quality atmospheric in little time, whereas Ambient Occlusion helps artists create and render realistic shadows.

A 3D paint tool for creating textures for 3D models, BodyPaint 3D Version 2.5 borrows the Heads-Up Display and easily customizable menu from Cinema 4D. New support for n-gons ensures smooth importation of models, whereas enhanced Adobe Photoshop support enables the application of layers and masks from .psd files as textures. BodyPaint 3D's RayBrush technology displays painting results in a rendered image in real time. With the addition of its new Optimal Cubic Mapping system, BodyPaint now provides three automatic UV unwrapping algorithms. —CEH

ILLUSTRATION

PRODUCTS

Alias Upgrades SketchBook Pro

Alias has announced the availability of its SketchBook Pro Version 2.

SketchBook Pro 2 paint and drawing software now offers creative professionals the ability to save a layered .psd file for use in Adobe Photoshop. Users also are provided the option to undo up to 75 brush strokes or actions, to resize any default brush, to create and store up to 28 custom brushes, and to work with an unlimited number of image layers.

Alias SketchBook Pro 2 is now shipping for Windows and Macintosh systems at a cost of \$199. —CEH



Image courtesy Vince Galante.

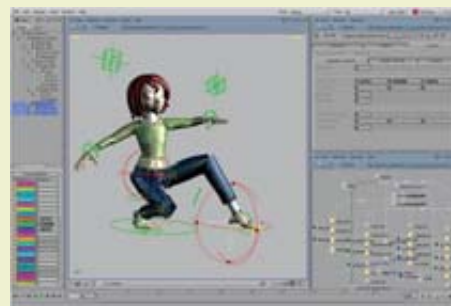
MODELING / ANIMATION

PRODUCTS

Side Effects Software Presents Houdini 8

Side Effects Software has posted a public beta of its Houdini 8 modeling and animation software to its Web site at www.sidefx.com.

Side Effects Software focused on the application's dynamics, lighting, and character animation feature sets when upgrading Houdini to



Version 8. Among the enhancements made to the latest software edition are a new parameter spreadsheet and render output dependency graph. Improved deep shadow maps speed the rendering of motion blur, transparent objects, colored transparency, and fine details. An enhanced light-linking editor helps users manage light, shadow, and reflection masks.

Visual effects artists will enjoy Houdini 8's new rigid-body, cloth, and curve dynamics solvers. The software's dynamics architecture even enables solvers to talk to each other; rigid-body objects can fall onto and impact cloth objects, for instance. Character animators can benefit from access to digital asset rigging tools for setting up body parts that have bones, kinematics, and constraints. —CEH

Digital Intermediates

By Peter May

I was proving to Annette

that box turtles don't have teeth, and are therefore harmless, when it nipped off the fleshy tip of my finger. It was an embarrassing comeuppance for an eight-year-old boy eager to impress an eight-year-old girl. Still, that turtle taught me a valuable lesson about overconfidence and presumption, a lesson I'd clearly forgotten as I dove confidently into the straightforward, well-defined topic of digital intermediates.

Plenty has been written in the past few years about digital intermediates and the DI work flow, but my first indication that this DI turtle might be hungry came when I happened upon a discussion board with scores of threaded entries by professionals who work with or around DIs simply trying to agree on an answer to the question: What is a digital intermediate? Is the term a nod to the film intermediates the DI might replace, or simply a label for anything digital and "in the middle?" What if the project is shot in HD? What if it's not destined for a filmout? It's all up for discussion.

With the self-assurance of a man with nine remaining fingertips, I've lifted liberally from

the thinking of others and constructed a definition we can use here today.

A digital intermediate is a representation of acquired visual content in the form of digital data files that allow potentially lossless manipulation of images with the goal of creating a universal master that, with minimal subsequent adjustment, is ready for output in a variety of distribution formats and digital archives.

Or you can go with the description offered by Efilm Digital Laboratories' Steve Scott: "The DI is film's best friend."

Scott, whose impressive credits as a supervising digital colorist include recent movie releases such as *Lemony Snicket* and *The Wedding Crashers*, explains, "Because the latitude you have in film is just so incredible, the digital intermediate is one of the best reasons to still shoot on film." Compared to the rudimentary chemical color-correction process, a DI allows today's colorists to do highly refined and selective color enhancement in layers of overlapping windows, defined by keys and traveling mattes—the same abilities enjoyed for years by computer artists, video editors, and commercial and music video directors who typically finish their films on video. However, not all film work is destined for filmout. Commercial and music video directors tend to shoot on film and finish on video. "This is the first time in the history of film that we've actually been able to delve into the secrets that have been hidden in the negative."

"I can't remember a film that I've done that I wouldn't want to do over again in the DI." That's an especially powerful avowal coming from Steven Poster the cinematographer who shot *Donnie Darko*, *Stuart Little 2*, and at least two-dozen other films. "Having the ability to control the image after it's made, to do more than just color timing, is a real blessing. It allows me to do that much more to direct the audience's eyes within the image."



IO Film, a full-service DI film finishing facility in Hollywood, used Digital Vision's Nucoda Film Master DI system to complete the 2K DI conform and color-grading processes for *Crash*, a full-length feature film from Lions Gate Films starring Sandra Bullock, Don Cheadle, and Matt Dillon. The Nucoda Film Master's resolution-independent, software-based color correction, conforming, editing, and effects features allowed IO Film's colorist Adam Hawkey to create an efficient DI work flow for the film.

Peter May

is a video producer and editor who has created television and video in all its forms. His list of credits includes numerous projects airing on the Discovery Channel, including 10 travel documentaries. He can be reached at pete@petemay.com.

A DI is one of the best reasons to still shoot on film.

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"It opens up new horizons for cinematographers," Post Logic Cinema Digital's Lou Levinson observes. Levinson, a colorist with 20 years' experience and credits that include *A Clockwork Orange* and a dozen Steven Spielberg projects, offers, "Given sufficient time and budget, you can pretty much get anything you can imagine."

For example, in what is considered a watershed application of the DI process, cinematographer Roger Deakins took verdant expanses of Mississippi countryside and created the burnt, brown fields that acted as a visual metaphor for the desperate days of the Great Depression in the Coen brother's epic, *O Brother, Where Art Thou?*

It may sound like DI is stepping close to CGI and effects but Steve Scott insists all toes are safe. "We're really focused on using tools that are appropriate for giving an overall look to a movie; we don't put dinosaurs in anything," Scott sees DI as a boon for CG artists because it eliminates the worry that their work will be pushed and pulled once it's out of their hands.

"I graded every scan before it went to the compositor," explains Steven Poster, talking about his DI work on *Stuart Little 2*. "We were dealing with compositing a white mouse into the scene. If we had to grade it [after compositing], matching shot-to-shot, we were going to change the color of the mouse." Scott adds that even films like *Robots*, a total CGI creation Efilm worked on earlier this year, can benefit from the process.

Standing at the Edge

A DI theater offers filmmakers a unique opportunity to see their creation "in a film environment, so they'll know exactly how the colors and what they're affecting will look like on the final film-out, which is very powerful," says Scott. Digital intermediates improve both the moviemaking and the moviegoing experience. Not only is the finished film closer creatively to the filmmaker's original vision, the print seen in theaters is closer

technically, as well. Once a film enters the DI process, there is, theoretically at least, no additional loss or degradation. The final release print should be as good as the initial digitization of the original camera negative (OCN), making that first step critical.

Today there are three primary levels of DI resolution: HD, 2K, and 4K.

At the low end of the spectrum, there's the digital intermediate created by ingesting film using a real-time, high-definition telecine. The result is SMPTE-standard HD video, 1920x1080, typically in a 4:2:2 color space at 6MB per frame. It's worth noting that Sony is marketing its new SR line of recorders (HD in a 4:4:4 color space) as "competitive with 2K data for high-end archiving and digital intermediate work flows."

The next step up is 2K, named for the approximate pixel width of a frame. At 2048x1556, each 10-bit, 2K frame contains approximately 12.8MB of data. Two hours of film, a modest amount of material for a feature, scanned at 2K, would require more than 2TB of storage. Currently, it's not possible to create a true 2K DI in real-time via telecine; it must be scanned in frame by frame. At a mean speed of 1.3 seconds per frame, two hours of film would take more than 62 hours to scan.

Sixty-two hours might seem speedy compared to the 91 hours it might take to scan a two-hour reel at 4K, the top end of current DI resolutions. At 4096x3112, double the resolution of 2K, the volume of data quadruples to more than 50MB per frame, gobbling nearly 9TB of storage.

Today 2K stands as the de facto standard for DIs. Some say a pristine OCN is closer to 6K but recall that the old photochemical work flow involved several generations of prints, translating into several generations of loss. Bottom line, the average movie showing in the mall multiplex probably has a resolution of 2K at best. But, that doesn't mean scanning the OCN at 2K is ideal. "2K is not enough," says Steven Poster, recounting his experience on *Stuart Little 2*. "Even though you output at 2K, you down-res to 2K. The extra headroom you get by scanning at 4K allows you to see Stuart's whiskers and the catchlights in his eyes more sharply; details that you don't get to see in 2K." Poster goes on to note that even 4K is only a step along the path. "Some people are starting to scan on the Northlight at 6K."

It's clear the creative community is smitten with the artistic possibilities of digital intermediates, which is driving the rapid trend to add DIs in the creative pipeline. With a typical price range between \$100 thousand and \$1 million, it's more difficult for studios to justify a DI on a purely economic basis. For now, at least, it's hard for anyone to say: All the money I've saved using the DI will easily cover the cost of implementing the DI!

But the DI can allow for some measurable line-item savings. For example, 3-perf, a camera system that pulls down three perforations per frame rather than the four found in a 4-perf system, is harder to print and project, but with the right rig, is not more difficult to scan for a DI. A 3-perf camera squeezes in more frames per foot, saving film stock, processing costs, and on-set time by lengthening time between reloads. A filmmaker might opt to shoot using 3-perf, while a DP or director might decide to keep rolling on a complicated setup or a compelling performance rather than stopping to make minor lighting adjustments, knowing that some things truly can be fixed in post. Of course, that's a snapping turtle. Lou Levinson has seen people bitten: filmmakers who keep saying, "Don't worry about it we'll fix it later, and suddenly you have a two million-dollar fix-it-later budget." ■■



CGW Online

Visit www.cgw.com this month as Peter May shares his perspective on the future of DIs in "Digital Intermediates: The Future Unfolds." Also get more information about commercial DIs and what's currently available for the production pipeline.

Shade 8

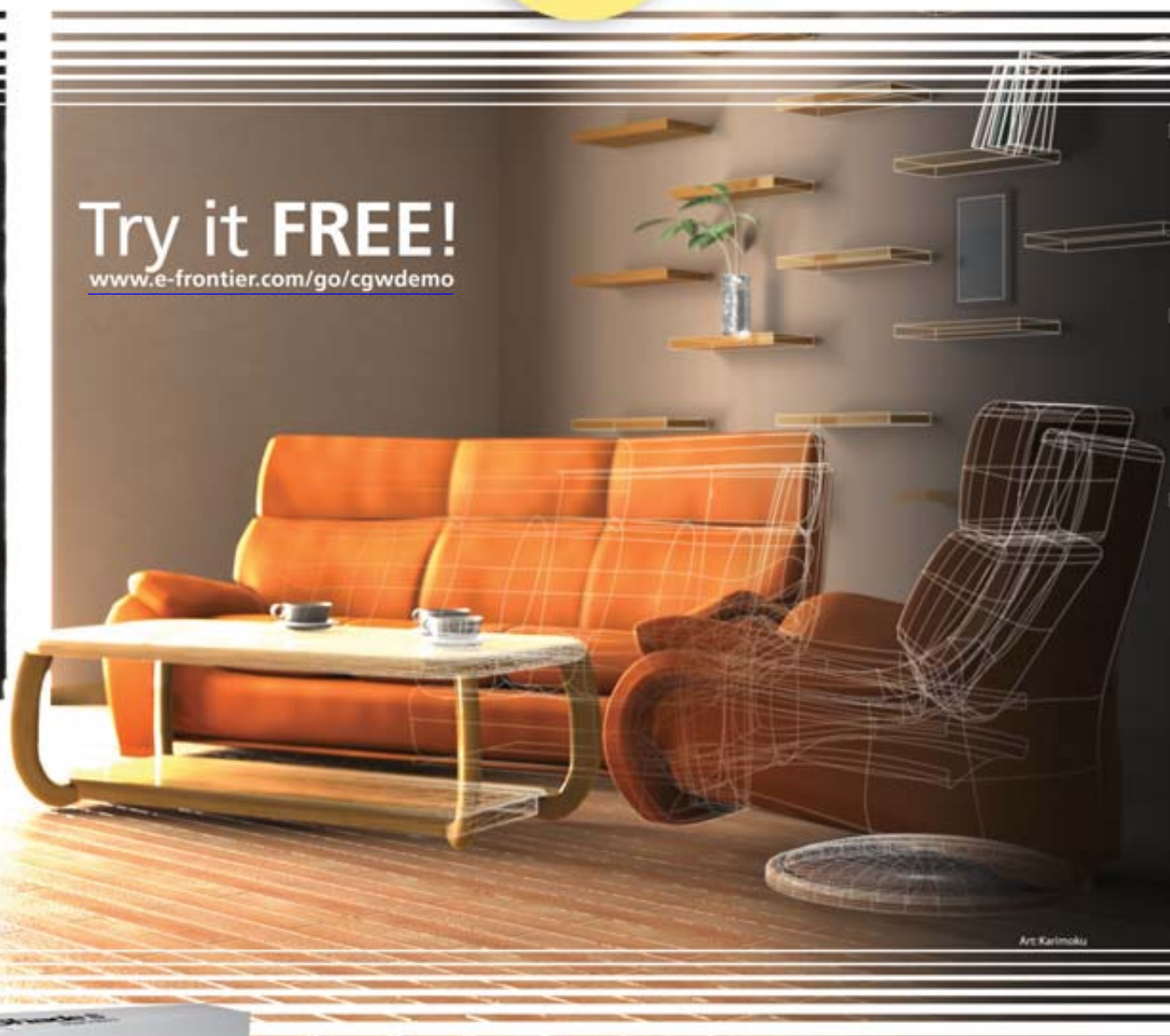
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Collada: Game On

By Kathleen Maher

Whether the publishers admit it or not, the game industry is in crisis. The costs associated with creating games are rising, deadlines are slipping, and the reality is that consumers are not going to pay much more than \$50 for a new game. At the heart of the crisis is the growing complexity of games, making them more complicated, and every bit as expensive to create as many major motion pictures.



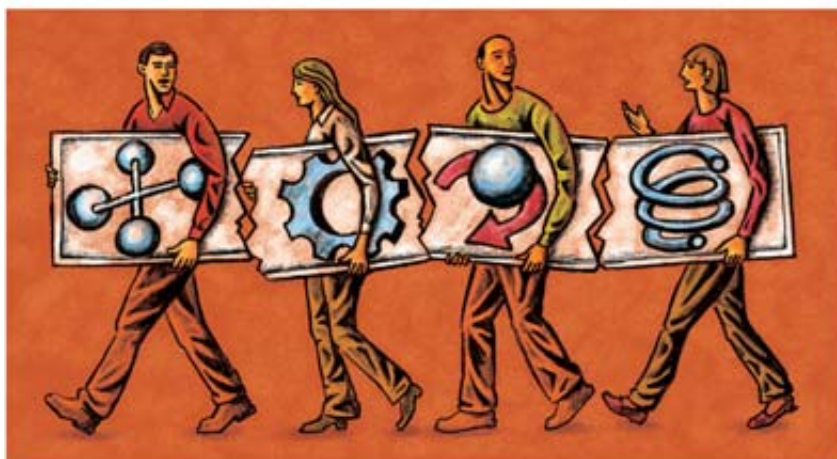
Kathleen Maher

is a senior analyst at Jon Peddie Research, a Tiburon, CA-based consultancy specializing in graphics and multimedia, and editor in chief of JPR's "TechWatch." She can be reached at kathleen@jonpeddie.com.

Console manufacturers are at the mercy of the game development community.

Console manufacturers are at the mercy of the game development community. The success of a new console depends a great deal on the number of games available to support it at launch. If the game developers can't deliver a compelling slate of games to coincide with the delivery of a new console, such as the Sony PlayStation 3, for example, it could easily slow down consumer acceptance of the product.

Sony proposes a solution in Collada, or Collaborative Design Activity, an XML schema that offers an intermediate format for game developers to losslessly exchange asset data between authoring tools. A tool-neutral, open standard that recognizes



the complexity of authored 3D data, Collada enables developers to mix and match tools from different vendors to create their own customized tool chains. The Collada XML schema enables a description of a database or directory so that data can be exchanged with all its components—including multiple versions of the same assets intended for different purposes or targets.

Perhaps a little history is in order. Back in 1999, and earlier, as Sony was preparing for the PlayStation 2, Sony's engineers knew that the platform would be challenging for developers. The company created a middleware program to encourage the development of tools to make content creation easier for those targeting the PlayStation 2. The program was a limited success. There are plenty of middleware tools available, but often game developers have to adapt the tools to their own uses and applications. Sony found that game developers themselves were too embattled to create their own tools. The idea of Collada is an expandable one that intends to build a framework for data creation and exchange that will provide a clear set of procedures as well as standards and formats for developers, allowing them to access, track, and exchange assets. Rather than encouraging companies to build tools, Collada functions as a pool that will grow in usefulness as companies contribute.

In the next step to making Collada more useful, Sony has made the format open to Khronos, an industry consortium founded in 2002 dedicated to creating tools and APIs that enable the authoring and playback of rich media on different platforms and devices.

Announced at SIGGRAPH 2005, Collada is a Khronos working group. As such, it is part of the open standards movement and is offered royalty free. Khronos has proven itself to be a practical resource for companies that need to reach common ground, in spite of the fact that they may be competitors or tangentially related. And, in the case of Collada, competitors Alias, Autodesk Media and Entertainment, and Softimage have signed on to Collada, and so have middleware companies, such as Aegia, Criterion, and Havok, and game developers like Backbone Entertainment and Vicarious Visions. Hardware companies Nvidia, ATI, and 3DLabs are longtime supporters of Khronos and are likewise supporting Collada.



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One of the more interesting developments is that Khronos, Collada, and Alias have agreed to add support for Collada to FBX, which was originally developed by Kaydara to function as a file exchange format. Kaydara was acquired by Alias more than a year ago, and as a result, there has been some concern in the development community about the true "openness" of FBX. As in any situation where a format is exclusively owned by a company, there is a fear that the company will be able to stay ahead of competitors by controlling the format. The fact that FBX is being worked into the Collada framework is a good example of how Collada can be adapted to fit within the production pipelines of game developers. Similarly, the Collada group is seeking to add asset management, and they have developed a specific work group for this purpose.

Avid, which offers asset management through its Alienbrain product, is an interested participant in the work group.

Sony, of course, is committed to Collada and plans to support the other Khronos standards as well. It has already announced support for Khronos's 3D API for embedded systems, OpenGL ES, as its 3D API for PlayStation 3 development. The Collada approach is not limited to Sony PlayStation development; it can be used in any 3D content development pipeline, including Xbox, PC, GameCube, and so on.

While Collada is primarily focused at the 3D modeling and animation portion of the pipeline, the idea is to create architecture capable of supporting an expandable range of capabilities associated with 3D modeling and animation, including physics, for example, and programmable shaders, which can be offered as packages.

At SIGGRAPH this year, the Collada group had presenters from Softimage, Nvidia, Alias, and Aegia, to name a few, demonstrate the exchange of models into and out of Collada. They proved it works. Khronos director Neil Trevett says the real advantage to having Collada in the Khronos family is the ability to keep development and deployment of Collada and OpenGL ES evolving together. "Each is aware of the needs and the opportunities that the other creates," he says.

Collada is not the first attempt to improve game development, but it represents an ongoing trend in several high-tech industries toward collaboration and open standards. For the game industry, at least, the old way of locking up content in proprietary formats isn't working. When game developers can't get their work done, no one wins. ■■

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the art of **the deal**

The battle for exclusive rights to sports franchises pushes gaming's creativity

By Martin McEachern

Not long ago, the biggest names in video game publishing—from Electronic Arts to 2K Sports—would race frantically to ready the latest season of their officially licensed pro sports titles and compete for the largest share of the marketplace. This open competition among multiple game publishers was the driving force behind creative and technical innovation in the games, and enabled the NFL, NHL, NBA, MLB, NASCAR, and other sports franchises to grow their fan base by expanding their reach across multiple titles.

Then, last winter, the rules of the game suddenly changed. Two exclusive licensing agreements—between EA and the National Football League, and 2K Sports and Major League Baseball—shook up the virtual sports landscape and left some of its most popular titles, including 2K Sports' *NFL 2K*, EA's *MVP Baseball*, and Midway's *MLB SlugFest*, extinct. In this one-two punch, the decades-long tradition of survival of the fittest succumbed to the billion-dollar economics of the gaming industry and gave way to survival of the richest (see "The Only Game in Town," pg. 16).

For better or worse, the spotlight is shining harshly on EA's *Madden NFL 06* this fall, soon to be the only game for NFL fans, who undoubtedly will be expecting more out of the title than ever before and identifying every flaw as evidence of the lack of competition in the game space. Sharing the spotlight with *Madden 06* this fall will be two other eagerly anticipated releases that have raised the bar for graphics and gameplay on the ice and on the court: EA's *NBA Live 06* and 2K Sports' *NHL 2K6*, whose predecessor, *NHL 2K5*, is considered the breakaway leader in the virtual world of the Stanley Cup.

Madden NFL 06

Guided by seasoned NFL television directors, the EA Tiburon team revised the camera work in its football game this year, unveiling new camera angles and lenses that bring the player closer to the action. “We implemented cameras that the user will trigger only under certain instances,” says *Madden NFL 06* producer Phil Frazier. “For instance, on certain touchdown dives, the game camera will cut to the player diving into the end zone, using cinematic camera angles never before tried during gameplay. We were careful not to interfere with the gamer’s POV, so we only punched into these cameras when they wouldn’t disorient the user.” Activated during clutch moments, most of these cameras have movement built in, so the camera can follow a player through his dive trajectory, or pivot around him as he kicks the ball.

Madden 06 also introduces “trench” cameras that trigger during third downs. Gamers see a “worm’s-eye” view of the players running up to the line before the point of view returns to the game camera in time for the player to see the field coverage. EA also expanded the TV cam, which handles replays and the action between plays, to include more dolly-in shots, down shots, up shots, and long shots. “We switched the lenses to include wide angles and more extreme perspectives. Depth of field didn’t always work for us, so we used it sparingly,” says Frazier, noting that users will see some shots that are unique even in broadcasts. In addition, the crew added 20 shots of the coach’s booth, which offer angles directly on the coach or looking down at the field from behind the coach. *Madden 06* also uses shots from various angles to capture players standing along the sidelines without their helmets.

In most cases, the cameras are embedded within the animation files, created in Alias’s Maya. However, sometimes they



Images © 2005 Electronic Arts

In *Madden 06*, the skeletal setup for a player contains 25 body joints, 32 finger joints, and two joints for controlling a prop, such as the ball.

had to be imported separately and animated by the programmer, in which case the animator and the art director sat alongside a programmer to ensure that the camera and the animation synchronized correctly in the game. For instance, the programmers, rather than the animators, collaborated with the art director to set the camera angles for the TV cam.

Another notable new feature is the quarterback-passing cone, which allows the gamer to swivel the quarterback’s head and field of view as the person drops back to throw a pass to a receiver. The player can then switch to the receiver, controlling his cone of view to make the catch. “The quarterback-vision cone is the most radical change made to *Madden* in the last few years,” Frazier points out. “We needed to ensure that the logistics of the controls were such that a novice or a veteran can pick up a controller and feel completely in control.”

Making the Playmakers

Granted greater access to the NFL, EA was given access to head scans of 150 players from the league. However, the artists found

The Only Game in Town

In December 2004, Electronic Arts paid an estimated \$300 million for exclusive rights to publish National Football League (NFL) titles for the next five years, sounding the death knell for Sega Sports/Visual Concepts’ well-received *ESPN NFL Football* series (formerly the 2K series) and every other competing or upstart NFL title.

After being courted by numerous media companies across the globe, the NFL initiated the exclusivity negotiations with EA. At that point, the outcome was inevitable: relinquishing the NFL license and losing its *Madden* series (the most commercially successful sports title of all time) was simply not in EA’s playbook. “Because of the deal, we have more access to players, coaches, teams, and other NFL assets than ever before, which allows us to create a more enter-

taining experience,” says Jeff Karp, vice president of marketing for EA Sports.

This past January, 2K Sports, Take-Two Interactive Software’s sports label, reacted to the deal by spending an estimated \$90 million to lock up the exclusive publishing rights to Major League Baseball (MLB) for the next seven years, killing EA’s genre-leading *MVP Baseball*. EA’s Karp points out that the fans now will be without the game they chose to play the most, and notes that “[we] will assess potential new directions concerning our baseball title.”

In the wake of these deals, EA is rumored to be exploring the possibility of continuing its *MVP Baseball* series using the collegiate ranks, while 2K Sports is expected to revive its *NFL 2K* series using Hall of Fame legends. Midway’s gridiron game

will be reborn as *Blitz: The League*, starring Hall-of-Famer Lawrence Taylor in an evolving narrative scripted by Peter Egan, writer of the former TV dramatic series *ESPN Playmakers*, set in a fictitious, hard-hitting football league.

The creative challenges of reinventing and rebranding a sports title are not new to EA. Indeed, when World Wrestling Entertainment (WWE) purchased Ted Turner’s rival World Championship Wrestling (WCW) organization, EA lost its WCW license, and with it, the right to use any of the well-known wrestling superstars. Setting the precedent for the kind of creativity developers will need to survive in this new era of sports games, EA resurrected its wrestling title using recording personalities from Rick Rubin’s Def Jam recording label, including Busta

the process of reducing these high-resolution polygonal scans to a game-ready model less efficient than sculpting individual facial features and applying textures onto a generic base head model. Therefore, the group sculpted each player's head while referencing the scans and high-resolution player photos provided by the NFL. The artists then manipulated each player's photographic source within Adobe's Photoshop and Right Hemisphere's Deep Paint 3D to create two texture maps for the face: a lower-resolution (mip-map) version and a high-resolution version bearing such fine details as scars and scratches. This allows the textures to decline in resolution as the players recede from the camera, similar to geometry level-of-detail (LOD) usage.

"We created unique facial geometry and textures for almost the entire NFL roster, and relied on generic geometry and face textures for last-minute additions or user-created players," says Frazier. The player heads are distributed in three LODs during gameplay, ranging from 900 polygons to 125 (the average), to 25 at the low end.

To accurately represent 22 players in real time, the game engine modifies the base build of a generic body using database entries for the characters' proportions and unique team apparel, equipment, and accessories. Superstar mode, one of the biggest additions to this year's *Madden*, allows gamers to assume the role of an NFL rookie as he's drafted into the league and proceeds through the entire arc of a multiyear professional career, enduring the trials and tribulations that come with the job. This includes signing and firing agents, dealing with off-the-field drama, fulfilling endorsement contracts, and

(Right) EA's DNA system lets gamers customize their own players. **(Below)** Artists visited each stadium in the league, gathering reference material for re-creating the exact layout of the seats, lights, banners, scoreboards, and more. All virtual seats reflect an accurate view of the field.



balancing personal obligations with commitments to a team. Using a DNA-based system, gamers can customize the polygonal build and textural details of their character.

Madden NFL 06 also introduces the "truck stick," which allows offensive bruisers such as Jeremy Shockey to drop a shoulder or throw a forearm shiver as they plough through the defensive line. The truck stick is the offensive counterpart to the "hit

stick," which allows defensive linebackers such as Donnie Edwards to execute some brutal tackles or knock an opponent off both feet. To capture the intensity of the in-game action, sideline pep talks, or a creative touchdown celebration, EA's character animators utilized a blend of motion-captured and key-framed animation for the players' body and facial expressions. Then, the artists sculpted blendshapes in Maya for the facial expressions, including grimaces, furrowed eyebrows, sneers, and smiles.

To craft the animations for *Madden NFL 06*, EA motion-captured players from the Canadian Football League using a Motion Analysis capture system

Rhymes and Ludacris. The game, called *Def Jam Vendetta*, was an overwhelming success, spawning a sequel that's scheduled for release this fall.

EA also holds exclusive rights to develop NASCAR games until 2009, and the developer recently announced a long-term licensing agreement with the National Collegiate Athletic Association (NCAA) for football. This relationship ensures EA's ability to maintain the linkage between its *Madden* and *NCAA* titles, enabling gamers to import top college seniors into the professional *Madden* game via draft export files, play through a four-year NCAA career and then graduate to *Madden* as an NFL player, or enter into Dynasty Mode as the coach of a college team.

Meanwhile, Sony Computer Entertainment Europe maintains the rights to Formula One racing,

and THQ has a stranglehold on WWE games. With the hockey lockout ending and many teams left in financial straits, the National Hockey League (NHL) may be unable to resist signing a lucrative exclusivity contract next year. However, this domino effect ends at the National Basketball Association (NBA), which announced this past March a non-exclusive agreement with EA, Take-Two, Sony Computer Entertainment America, Midway, and Atari.

"This is a great day for NBA gamers," proclaimed Adam Silver, NBA entertainment president. "By partnering with the top developers of sports video games, we have ensured our fans a broad, competitive selection of games that will be available in over 100 countries and on more platforms than ever before, maximizing the reach of the NBA around the world." —MM

●●●●● Gaming

and proprietary software. (Stuntmen provided the moves for the big offensive and defensive animations of the hard hits and truck sticks.) The crew then used Alias's MotionBuilder to map the animations to their respective skeletons, which were refined in Maya.

In addition, the programmers revamped the characters' adaptive AI so that, for instance, the defensive secondary can cut down on plays that always work. "We wanted the player to have fun but without running the same play over and over because it has a high success rate," says Frazier. "Yet, we did not want the average player to feel like he or she cannot win because the AI has 'learned' the person's playing habits."

For streamlining the overall production process, the EA Tiburon group incorporated Avid's Alienbrain Studio (formerly from NXN) for asset management and Perforce for software configuration management into its pipeline.



EA's proprietary tool set enables the animators to easily position or rotate the 20-some characters in a scene, pose their hands, and so forth.

NHL 2K5

The **player lockout** may have kept hockey's best from donning their skates for the 2004/2005 season, but the disagreement didn't prevent them from taking to the virtual ice in 2K Sports' *NHL 2K5*, developed by Kush Games and universally acclaimed by gamers and critics alike as one of the best hockey simulations. Now that the lockout is over, 2K Sports is set to release its follow-up, *NHL 2K6*, sporting newly revamped goalie controls and an emphasis on animations for enforcers such as Tie Domi and Rob Ray.



Images © 2005 2K Sports.

Through the use of normal mapping, the artists at 2K Sports were able to achieve a high level of detail in their *NHL 2K6* player models, as seen here in the padding, gloves, stick, and helmet of this goalie.

Kush Games, like EA and every other officially licensed sports game developer, had to contend with the challenges of creating hundreds of recognizable heads. "Getting good photographic reference for the players is crucial and often one of the bottlenecks in the development process," says Al Spong, art director for Kush Games. "Most leagues only provide portrait shots, which are not ideal for use in video games because the players usually are smiling and inconsistently lit." As a result, the artists must labor intensively to remove shadows, highlights, and smiles just for creating a texture map.

The NHL has yet to act on developers' requests for multi-angle photographs or scanned data. Presently, of the four major US sports, only MLB games feature polygonal head meshes based on 3D scans, which are done yearly by InSpeck during spring training. While the NFL has begun preliminary testing with 3D scanning, the league's games, along with those of the NHL and NBA, still feature photographic head data.

"We would love to have scanned data at our disposal, but it can have a grotesque quality and is generally difficult to just push into a game [without a lot of additional work]," says Spong. "Right now, we rely on our artists to build and texture unique heads from scratch, which is time-consuming and demands a significant chunk of the development budget. But we believe this [reality] aspect is an important part of the product."

While the players in *NHL 2K6* feature significantly more polygons than they did in last year's edition, the team used normal mapping to create an unprecedented LOD in the grooves of the goalie padding, gloves, and blockers, and the hard edges and ridges of the helmets and skates.

For facial animation, 2K Sports currently uses a bone-based deformation system. To create an aggressive snarl during a fight,

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for example, the artists use a range of Set Driven Key sliders to control the various expressions and viseme shapes of the players, all of which are built into a Mel-scripted interface.

Power Play

NHL 2K6 also introduced “maximum goaltending” this year, which gives players precise control over their goalie. One glance at the animations of a goaltender stacking his pads or dropping into the butterfly stance for a dramatic save, and one should notice a striking resemblance to the technique of Marty Turco of the Dallas Stars. That’s because Turco, along with Darren McCarty of the Detroit Red Wings and Jason Marshall of the New York Rangers, were motion-captured for the game using a Motion Analysis system.

The crew captured a wide range of hockey moves, including skating, goalie saves, stances, reactions, slap shots, tripping, checking, and more, including ambient actions. Using Maya, the team cleaned up the cycles and mapped them to the character skeletons.

“The player skeletons in *NHL 2K6* are



To achieve the realistic actions in the title, a number of NHL players were motion-captured performing a variety of basic and specialized hockey moves, from skating and ambient motion to slapshots and checking. In addition, the 2K Sports team added a new feature to its game called maximum goaltending, which gives the gamers precise control of the goalie and his actions.

designed to produce a range of motions as efficiently as possible, since the screen is filled with numerous players. Keeping the frame rate at 60Hz is a constant battle,” says Spong. “In our next-generation hockey titles, we will introduce more subtleties into the motion using customized rigs for each player, so that the goalie model, for example, will deform differently from, say, a forward, based on the equipment that’s worn.”

As Spong points out, realistic deformation is difficult to achieve in a hockey game. Mainly, this is because the layers of clothing and padding exhibit different degrees of deformation. Also a problem is the complex interaction between the cloth, the player, and the environment.

NBA Live 06

Basketball, unlike football and hockey, is a sport in which a winning team can be almost single-handedly shouldered by one superstar. Shaquille O’Neal, Tim Duncan, Yao Ming, Dwyane Wade, LeBron James, and Steve Nash are the pillars of their respective teams, and are the inspirations for the new freestyle superstar controls unveiled in *NBA Live 06*. The controls will ensure that the NBA’s powerhouses will pass, dribble, block, and dunk on the virtual court like their real-life counterparts.

According to *NBA Live 06* producer Dean Richards, all authentic sports games strive to separate the superstars from the generic players, and hone in on what makes a player a superstar. Yet, when it comes to basketball, there are fewer standouts than there are in other sports—only 12 to 15 percent of the NBA’s 450 players are legitimate superstars, he contends, and many of them exhibit a unique style of play. For example, Nash is a playmaker with great court vision who can pass from any-

where, while Wade is a high-flyer who can take the ball to the hoop using an aerial attack. “And this is what freestyle superstars is all about,” notes Richards, “focusing on what makes these players superstars and giving users the control to express themselves on the court when playing as or against a superstar.”

To create the freestyle superstar moves controlled by the user, EA invited Wade and other NBA stars to

EA used image-based techniques to model its NBA roster, which includes LeBron James, shown here.



Images © 2005 Electronic Arts.

Vancouver, Canada, for a motion-capture shoot. “The invited NBA stars represented a wide variety of body sizes, so that the captured movements could be tailored to every NBA player’s unique proportions, producing the most believable motion for each,” says Richards. Using EA’s custom Vicon mocap setup and a truss system holding more than 50 cameras, the crew captured the NBA superstars performing a range of passes, dunks, steals, blocks, lay-ups, and shots (at 45 degrees and other difficult angles).

With MotionBuilder, the artists edited the data and then animated the player skeletons using a control rig outfitted with a combination of IK and FK solutions on both the lower and upper body, which, according to Richards, produced realistic, fluid results. The group also motion-captured all the locomotion cycles for the non-superstar players, giving this year’s *NBA Live* a new look and feel. In addition, EA captured new passes and receptions, which significantly change the flow of the game, especially the “transition” gameplay, making it more explosive and fluid, akin to a typical NBA match.

Even though EA reused the character skeletons from last year’s *NBA Live*, the artists had to redo some of the skin weighting to accommodate the new superstar moves, especially those requiring an extreme range of movement, such as windmill dunks. “Many animations had to be reworked because the new textures have a better-defined musculature, which, at times, made improper bone twisting more noticeable than it was in previous titles,” says Richards.

To forge the illusion of real-time cloth simulation, the artists added additional bones to the player’s uniform shorts, which are controlled programmatically during gameplay to provide secondary animation. In addition, the MotionBuilder control rig contains built-in constraints for interactions between the ball, the players, and the hoop that enable the players to interact simultaneously with one another and with the hoop during “dunk-blocking” scenarios, new to *NBA Live*. Despite these efforts, many of the animation improvements resulted from artists with keen eyes, who watched hours of reference video and applied those actions to the animations.

In contrast to the authentic-style moves, the artists eschewed cumbersome 3D scans for this title as well, and instead modeled the entire NBA roster using image-based techniques, maintaining a low-polygonal count that relied on mip-mapping for real-

ism. Each player’s head is a modified version of standard head setup, while the bodies are generated in real time from a database of proportioned anatomy. Nevertheless, some well-known players, such as Shaq and Yao Ming, were custom modeled because of their unique appearance.

Killing the Competition

Issuing exclusive licenses to companies indeed has been a common practice for sports franchises. Nevertheless, unlike conventional sports merchandising, such as replica jerseys or cross-promotions involving soft drinks or breakfast cereals, a video game has the ability to cultivate an understanding of a sport, player characteristics, and game strategy. A well-designed NFL title, for example, can build an emotional investment in athletes or a team like no other marketing vehicle, and do so in countries where the NFL is underexposed.

In so far as a game title can broaden a sport’s audience and appeal, exclusivity agreements can have an adverse effect through the loss of

New to *NBA Live 06* is freestyle superstar control, which ensures that the virtual MVP players perform the same signature actions as their real-life counterparts do on the actual court.



both fans and hours of free advertising. In the worst scenario for consumers, if a game publisher is unable to renew its license after it expires, the lack of competition could leave rival developers ill-prepared to produce a quality next-generation game. On the other hand, if desperation breeds inspiration, we may be on the cusp of one of the most creative eras in sports gaming. #

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••••• Film

Gromit

By Barbara Robertson

Artists add 3D to Aardman's
traditional claymation recipe

Horrors! A giant vegetable-ravaging rabbit monster is attacking the gardens in a small northern England village. Who will save the day—and the carrots, tomatoes, and courgettes? Why, Wallace and Gromit, of course.

The intrepid inventor and his faithful dog, now successful owners of Anti-Pesto, a humane pest-control business, have already been helping the gardeners prepare for a giant vegetable competition by removing veggie-nibbling bunnies. So, who better to apprehend a mysterious beast? When contest hostess Lady Tottington hires the beloved plasticene characters to protect the plots from the hare-y fiend, the fun begins.

Nick Park, *Chicken Run* director and Wallace & Gromit creator, joins Steve Box in directing Aardman Animations' and DreamWorks Animation SKG's *Wallace & Gromit: The Curse of the Were-Rabbit*. And if history is any indication, the feature-film debut this month puts the *Wallace & Gromit* film in line for a Best Feature Animation Oscar next year. Two of Park's Wallace & Gromit short animations, "A Close Shave" and "The Wrong Trousers," won Oscars; the third Wallace & Gromit movie, "A Grand Day Out," was nominated for an Oscar but lost to Park's short "Creature Comforts."

Peter Sallis, Wallace's voice in all three short animations, again provides Wallace's voice in the feature; Helena

Bonham Carter is the voice of heiress Lady Tottington, and Ralph Fiennes provides the voice for Lord Victor Quartermaine, Lady T's suitor. Gromit expresses himself with body language: He doesn't have a voice...or even a mouth!

CG Assistance

To free the gardens from a bunny invasion, Wallace invented (with Gromit's help) a machine called the BunVac 6000, which sucks the little critters into a canister. But the ever-resourceful stars of the world's first claymation vegetarian horror film couldn't invent everything required for their big-screen debut. They needed a little CG assistance from their friends at London's Moving Picture Company (MPC).

Paddy Eason, who had acted as digital effects supervisor for *Chicken Run* while at Framestore CFC, was the visual effects supervisor for MPC's work on *Wallace & Gromit*. "It was déjà vu, in a nice way," he says. "*Wallace & Gromit* had more work, and it was more interesting. In addition to effects animation, we did a fair amount of pure character animation."

Because Aardman films the stop-motion claymation, MPC's efforts mimicked, in many ways, visual effects work for a live-action film rather than an animated film. The crew digitized every frame of *Wallace & Gromit*, color-timed it, and put

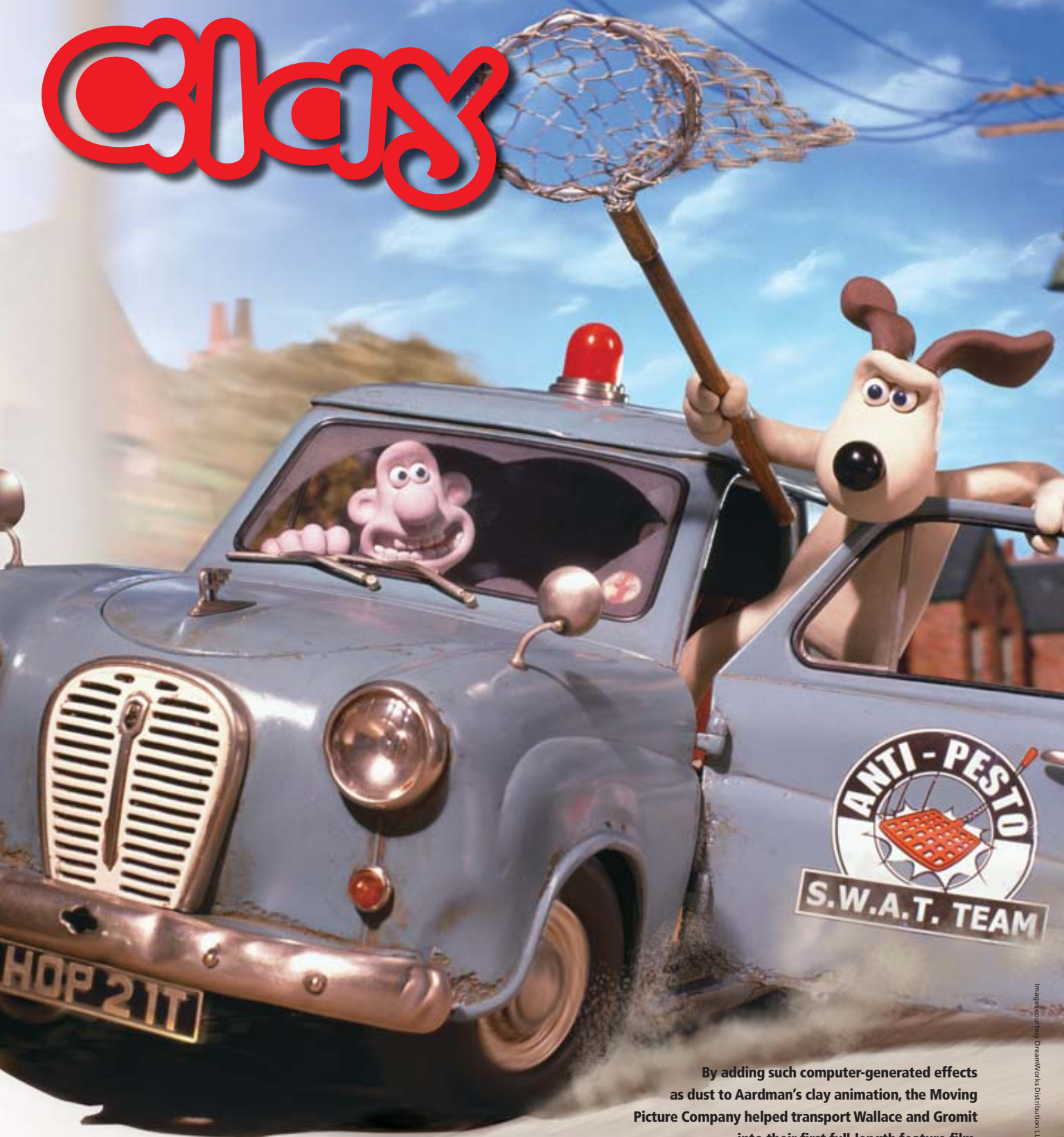
it back onto film. They also removed rigs, composited 2D and 3D effects into green-screen plates, and created digital doubles. The differences are in the details, and the details are intriguing.

Take, for example, digitizing the film. "This was a necessity, not a luxury," says Eason. "An animator might animate away happily and then decide the last three frames could have been better." When that happens, the animator starts again from the point where the animation was good. Later, editors can piece the animation together digitally rather than by cutting negatives—a decided advantage.

Color Control

Color-timing, or color-grading, the digital film let the artists fix lighting problems on the set—in this instance, "because things happen," says Eason, rather than from shooting under different sky conditions, as is often the case in a live-action film. Some shots take place on stage for several days," he notes. "Lamps tend to blow, [creating] lighting changes." With digital color timing, the crew could smooth the lighting changes.

Clay



By adding such computer-generated effects as dust to Aardman's clay animation, the Moving Picture Company helped transport Wallace and Gromit into their first full-length feature film.

Images courtesy DreamWorks Distribution LLC.

For color grading, MPC used Quantel's QColor system; for monitor control, the group utilized FilmLight's Truelight color management system. "It's noticeable how much DI has improved in speed and color imagery since *Chicken Run*," says Eason. "And, what you saw on the screen only approximated what you'd see on film in those days. The colors were unpredictable; whereas, on *Wallace & Gromit*, what we saw on the monitor was close to what we'd see on film."

For rig removal and other 2D "fixes," and for 2D effects and compositing, the crew used Apple's Shake. A custom pipeline that retained the film's edge numbers within the DPX file headers throughout the VFX process helped automate the final assembly of the movie.

Two of the claymation characters, Lady Tottington and Victor's dog, Philip, couldn't stand on the weight of their own legs, so an apparatus always held them. Knowing that MPC would remove rigs for these characters and others, the crew shot clean plates—film of the set without the rigged characters—for the compositors to use later. Because every camera move in the film was motion controlled, the two plates—film with the characters and film without—matched perfectly.

"Traditionally, stop-motion animators went to great lengths to hide rigs, but because the whole film would be digitized anyway, it was easier to leave the rigs in and have us paint them out," says Eason. The compositors also used dual plates to fix small accidents that happened when an animator inadvertently moved something in the set.



As in a live-action movie, Aardman would often film the "actors" against greenscreen. MPC would composite the background in later.



Knowing that the crew from MPC would fix the shots later, the Aardman team did not need to hide items such as rigs and apparatus during the animation process.

Foggy Bottoms

The film's 2D effects included fire, mud, fog, and mist. Compositors added fire—in a fireplace, on burning candles, and so forth—by blending filmed elements into the live-action plates. Working in Shake, they generated the mud kicked up by a rabbit digging a tunnel. "We used simple particle methods and noise functions," says Stuart Lashley, who led a team of as many as seven compositors working on *Wallace & Gromit*. The compositors also handled the fog and the mist.

"This is a horror film, so a lot of the scenes were filled with mist and fog," says Eason, "and it's not possible to have stop-motion fog."

In fact, Aardman tried motorizing pieces of gauze while shining light through them, but the result wasn't what the animators wanted, according to Eason. If they filled the set with smoke to simulate fog and then animated the characters in the mist, the movement of the mist wouldn't correspond to the stop-motion animation. Instead, compositors inserted the animated characters into shots of a foggy set or added the fog with photographic elements.

For these scenes, the compositors sometimes extracted animated characters from sets, but more often lifted them from greenscreen or bluescreen shots. Our first look at the were-rabbit, for example, is one such scene. "The forest is filled with fog," says Eason. "In nearly every case, the were-rabbit was shot against a greenscreen and inserted into the forest."

When the compositors needed to work with characters filmed against greenscreen, they also received beauty shots of the same character without the greenscreen. The crew would position a character, shoot a frame, and then slide the greenscreen behind the character and shoot another frame. "We used the greenscreen as the matte key and then the beauty pass for the composite," says Lashley. "It was an absolute perfect match. We never had to worry about green spill and light reflectance."

In addition to blending characters into a fog, bluescreen techniques helped Gromit and another dog fly airplanes. "Gromit, in one airplane, is chased by a dog in another airplane, so a lot of the time during the dogfight, we had the planes against bluescreen for practical reasons," says Eason.

The crew also replaced bluescreen in a car window with street scenes shot separately. "Usually you want to put bluescreen as far back as possible, but these sets were small and weren't designed with space behind them, so the lighting wasn't ideal," says Eason. On the other hand, stop-motion photography meant that there was rarely a problem with motion blur on the edges, and rotoscoping was less demanding than is sometimes the case with live action.



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••••• Film

Although the crew on *Chicken Run* had used many of the same techniques, one difference with *Wallace & Gromit* was that the effects and digital animation happened during principal photography. “In no way was this a postproduction effort,” says Eason. “They would roughly cut the animation together and turn it to digital quickly; they were shooting final scenes and delivering them to us right up to the deadline.” That gave the MPC crew, which topped out at around 20, longer to work on the film and the opportunity to get feedback as they worked.

That feedback was especially important for the 3D animation. “Aardman was tentative about 3D,” says Eason. “But, they were open-minded.” They had to be: They could not have created the scenes they envisioned in claymation.

Digital Doubles

When Wallace and Gromit vacuum up the bunnies, the creatures swirl around inside a large container, something that would have been impossible to create with clay bunnies on little rods. When the bunnies are on the ground, they’re clay; when they’re in the air or touching down, they’re CG. “They cut real clay bunny shots directly next to our CG bunnies,” notes Eason.

For the 3D work, MPC relied on Alias’s Maya for modeling, animation, and effects, on Pixar’s RenderMan for rendering, and used the EXR file format developed by Industrial Light & Magic for high dynamic range images. Modelers created digital bunny doubles from scans of a clay bunny, and then sculpted variations, adding glass eyeballs to mimic those of the clay bunnies. Riggers copied the claymation armature to make sure the digital bunny would have the same freedom of movement as the clay bunny.

“The characters are simple,” says animator Jason Wen. “But there were so many of them.” Wen, whose animated short film “F8” won Jury Honors at SIGGRAPH 2001, was the only animator on the project. He created 35 shots with as many as 30 bun-



Rig removal and greenscreen composites were made easier by using clean plates of the set filmed with the same motion-controlled camera move that was used for the animation.



Because it would have been impossible to rig and move clay bunnies inside Wallace’s BunVac, the group at MPC created, animated, rendered, and composited CG bunnies instead.

nies floating counterclockwise inside the closed container.

At first, Wen thought he could modify a 400-frame animation cycle for all the bunnies in all the shots, but the directors wanted to have one of the bunnies do some kind of cute, funny action—swim against the flow, for example, or look at Wallace or Lady Tottington as it drifts by. “In ‘Creature Comforts,’ you see an animal giving an interview in the foreground and, in the background, something funny is happening,” Wen says. “That’s what we did with the bunnies.”

Although Wen ended up animating every shot by hand, he still started with a dynamic simulation in Maya to create a flow of low-poly proxy bunnies that didn’t collide or pass through one another. Then, he attached actual bunnies to the simulation. “That got me 60 percent of the way there,” he says. Lastly, he hand animated the bunnies doing hero motion.

Wen began the hand animation by keyframing it, then once approved, baked it in Maya using a stair-step linear interpolation between the keyframes to create the animation on twos. However, this animation often produced strobing, especially in the ears, so Wen animated on ones—that is, he animated every frame. This took between 10 and 11 months to create the 35 shots. “It had to look hand animated,” he explains.

Frame-by-frame animation was even taken one step deeper when MPC helped transform a clay hand into a furry paw for three shots in which one of the characters turns into a were-beast. “Because the clay changed constantly, to match it, we had to change the geometry from frame to frame,” says Wen. For the fur, MPC used its Delilah, a custom plug-in for Maya the studio wrote

for the werewolf in *Harry Potter and the Prisoner of Azkaban*.

Fortunately, the *Wallace & Gromit* bunnies did not have fur. Moreover, unlike many 3D creatures, the skin surface didn't slide; the creatures had to retain their volume. Even so, at first, the digital models didn't look quite right. So CG lighting artist Ben Toogood created the shaders and lighting that made the digital models look like their plasticene counterparts.

"When we looked at our animation, we realized something was missing," says Wen. "So we checked footage from the film and could see little fingerprint marks and indentations on the clay where the animators had bent an arm or had moved a head." Toogood's shaders reproduced that handcrafted look dynamically: The shaders determined the amount of stretching and applied thumb indentations on parts of the figure based on the amount of manipulation that had been done. This solved the problem for mid-ground bunnies, but close-up critters required extra attention.

"In one shot in particular, you see a bunny's head go right past the camera, and it fills up the whole screen," Wen says. "It does a little smile when it floats by and goes a bit googly-eyed."

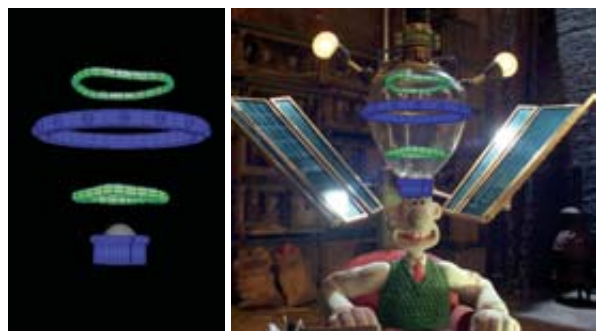
To create textures for that rabbit, MPC photographed the clay model with a high-resolution Canon digital camera, and used textures created from those photos to add detail. The texture artists at MPC use Adobe's Photoshop to paint textures, and Right Hemisphere's Deep Paint 3D to remove seams.

Mind-o-Matic

In addition to 3D bunnies, Wen worked on two important 3D effects: mind waves and a little basement destruction.

Wallace's BunVac was so successful, the dynamic duo quickly filled the house on West Wallaby Street with multiplying bunnies that Gromit had to feed. To solve that problem, Wallace invented a "Mind-manipulation-o-matic" that he hooked to the

To create the mind waves for Wallace's mind-melding machine, the crew at MPC crafted smoke rings in Maya that were then rendered with RenderMan and composited in Shake.



BunVac to do a little bunny behavior modification via a mind meld. Of course, everything goes wrong.

Although in these scenes Wallace, Gromit, the backgrounds, and the various inventions are all real, the mind waves are CG. "The mind waves had to look physical," says Eason, "because everything in *Wallace & Gromit* is gnarly, something you can touch. But, they also had to look ethereal. So it was a creative challenge."

For references, the crew looked at the circles of lights generated by lady robots in Fritz Lang's 1927 film *Metropolis* and at the crazy electrical effects in *Frankenstein* movies. "The mind waves were an homage to the Hammer horror movies of the '60s and '70s," says Eason. The crew created the resulting luminous glowing circles of lights with a smoke effect that Toogood crafted in Maya using Mel scripts and rendered with RenderMan. "We tried to get the motion of smoke rings that roll through the air," says Eason.

When Wallace's inventions go haywire in the cellar, Wen and Toogood used hand animation and particle effects to add CG destruction—the glass shards flying around and the mind waves flying off into space—to that filmed on set.

"In stop-motion animation, you can take a certain amount of license because it's a cartoon fantasy," says Lashley. "But it's still photographed in the real world. So, we made our CG bunnies look like they were shot in front of a camera with real lighting conditions. But for the magical bits like the mind waves, we took some license because they were not real."

To duplicate the on-set lighting, the crew rendered the bunnies with additional passes for various light sources, shadows, reflections, and so forth, so that the compositors could more easily tweak the values in Shake. In addition, the compositors used a secondary pass to adjust the beauty pass.

"The secondary pass allows us to relight the CG in Shake," explains Lashley. "We can go further than changing color and intensity; we can actually move lights around." This was necessary because even though *Wallace & Gromit* is an animation, the compositors still had to match photography, just as in a live-action shoot.

Indeed, in many ways, claymation seems to be a cracking fit for visual effects—a visual effects artist's dream job. "The way an animated movie is put together is the way we like to think," says Eason. "Everything is planned out; there are storyboards



before anything is shot. And the process of shooting an animated movie is more like postproduction than a live-action movie. I'd love to do another." ##

Barbara Robertson is an award-winning journalist and a contributing editor for *Computer Graphics World*. She can be reached at BarbaraRR@comcast.net.

By Karen Moltenbrey

Big, Bad

Nearly everyone grew up reading the edgy fairy tales from Wilhelm and Jacob Grimm: “Hansel and Gretel,” “Cinderella,” “Little Red Riding Hood,” “Snow White,” and many more. In the feature film *The Brothers Grimm*, digital and practical effects enabled director Terry Gilliam to give the folklore a darker, more sinister look and feel as a number of these tragic, familiar characters come to life on the big screen alongside other heroes and villains—some live, some CG.

The action/adventure/fantasy film places its own spin on the tale of the real Grimm brothers, as the legendary sibling scribes travel the medieval countryside offering villagers protection from nonexistent monsters and demons. Soon enough, though, the con men’s stories are put to the test when they encounter a real magical curse within an enchanted forest. Woven into the story fabric of the film are threads from the actual Grimm tales, including a bizarre slant on “Little Red Riding Hood” that features one of the movie’s most pivotal characters, and the most complicated to create: the wolf.

Wolf

Artists transition a man
into a wolf for the film
The Brothers Grimm

In keeping with the movie's theme, the animal is far from ordinary: It's a werewolf. In animal form, the beast—created using CG—is a vicious, spellbound hunter serving an evil queen. In human form, the creature assumes the identity of the woodsman (played by actor Tomas Hanak), who is heroine Angelika's father. During the transition from beast to man, however, the woodsman was played by a digital actor.

"Creating a CG wolf was difficult in and of itself, particularly when it came to the fur," says John Paul Docherty, digital effects supervisor at Peerless Camera Company, a London visual effects facility formed by Gilliam and the film's VFX supervisor Kent Houston more than two decades ago during the making of *Time Bandits* and the *Monty Python* movies. "In addition, we had to have a wolf that was vaguely manlike in its appearance. Also, transitioning the model to human form added another dimension to the task's overall complexity."

A Wolfish Appearance

Initially, Gilliam had planned to use an animatronic to accomplish all the wolf close-ups, and employ CG for what were to be no more than seven fairly wide shots of the animal leaping and such. However, that number soon grew to almost 50 and included a close-up of the wolf's eyes that filled the entire theater screen. Under those conditions, the animatronic "just didn't stand up," says Docherty. "And, it didn't look like anything Gilliam had in mind. It looked far too tame. So the animatronic ended up in the bin." As a result, the wolf model was crafted entirely in 3D with Softimage's XSI.

Yet, even the initial task of designing the animal became extraordinary. "The animatronic wolf looked like an Alsatian dog," says Docherty. "If you are familiar with Terry Gilliam's style (*12 Monkeys*, *The Adventures of Baron Von Munchausen*), then you would know that nothing could be further from a Terry Gilliam wolf than a dog-like animal. It had to be mean, with knobbly limbs and a 'Gilliam look' to it. That is just about impossible for the effects

crew at Artem, and downright difficult for the CG artists at a workstation."

According to head of 3D Ditch Doy, the artists first looked at the skeletal structures of wolves, but they didn't have what Docherty describes as "a man trapped in a wolf's body" feel. Next, they examined horses and other animals to use as references for their model. In the end, the bone structure of the Gilliam wolf was based on those of a modified lion and revised hyena, with a large, barreled chest and skinny hindquarters—and, of course, a scary look.

Within XSI, the group created two different skeletal structures: a quadruped for the wolf and a biped for the man,

ing enough as it landed, so it kept getting pulled back more and more into the realm of this large heavy animal," notes Doy. However, remnants of the animal's lighter version are still present in a few scenes as it bounds through the woods, seemingly lighter than air.

At times, though, the team struggled to determine whether the model's animation should be styled as the wolf or as the woodsman, especially immediately before or after a transformation. In one such sequence, the creature drops down to all fours and catches an arrow in its teeth. "We must have animated that more than 50 times, and the issue always became whether it was more man or animal at



For the werewolf in *The Brothers Grimm*, the artists had to create an animal with some human characteristics. This included the wolf's eyes: In a crucial scene, the heroine recognizes them as belonging to her father.

which was used immediately following the beast's transition to human form. "We built our rig for the wolf to reflect a creature that walks on all fours. Then, during the transformation, the bones in the shoulders and torso break apart, and he stands upright," says Doy. "But that didn't always work in the early tests, and it didn't look very menacing." Only after a tremendous amount of R&D and by utilizing a number of cheats, the team finally was able to adapt the quadruped rig for the desired transitional action.

The animal's supernatural animations, many created with XSI's animation mixer, also required the group to think outside the laws of nature. The concept that the creature was superhuman and nearly inertia-less resulted in grand leaps and aerial feats. "But it soon became apparent that the wolf was not threaten-

that point," Doy says. The final animation (favoring the animal) was only determined at the eleventh hour.

"There are a number of times when that situation arose," adds Docherty. "They were tough calls. That's what happens when you have an animal and you sell it as a human character."

Furocious

To texture the animal, the artists used XSI's integrated fur system, which is roughly based on Joe Alter's Shave and a Haircut software package. Still, the group spent a good deal of time writing its own tools in order to get the simulation to work properly for handling the quantity of fur and the specified lighting.

"Most of the fur we had seen elsewhere was straggly, no doubt because of the computational overhead and the diffi-

Modeling / Animation

culty of the lighting, since fur primitives are not normal CG structures,” explains Doy. “So we did a lot of work with the [Mental Images] Mental Ray guys, particularly Thomas Zanker, who was on site at Peerless for nearly four months helping to debug the implementation of the hair renderer in Mental Ray.”

Zanker, along with Raffaele Fragapane, Peerless’s lead technical director for the wolf sequence, implemented the fur system into the studio’s render wall through a proprietary rendering system managed by Greg Ercolano’s Rush Render Queue software. Then, the group had to debug what Doy terms “a number of interesting problems” so that the fur rendered in less than six hours a frame for a single 2k shot. In the end, the team streamlined the process by optimizing the code, allowing the artist to reduce the rendering to between 20 and 30 minutes per frame.

For lighting, the group rendered individual light passes, using what Docherty describes as a cinematographic rather than a CG approach. “Under normal circumstances, this is not the way to go because fur is so expensive to render,” says Docherty. “But we had a situation whereby if we changed the viewpoint and changed just one light, the creature went from this ferocious wolf to a lovable pet.” Taking advantage of the reduced rendering times, the team decided to layer the light passes, which lead compositor Dennis Jones compiled inside Autodesk Media and Entertainment’s Discreet Inferno and Apple’s Shake.

As a result of this method, the team eliminated the usual crackling that occurs with rendered fur. “In the close-ups, the creature has a full coat of hair, and the hairs reacted exactly as we wanted them to,” Docherty says.

Transition Phase

With the wolf model complete, the group turned its attention to the animal’s alter ego as it transforms into the woodsman, who wears a shabby cloak and a hat made from several wolf pelts. This transition occurs several times during the film—sometimes by firelight, sometimes in daylight.

To create the digital human used in the conversion process, a crew from Eyetronics digitally scanned the actor dressed in the bulky fur clothing. As Docherty points out, the scan did not provide the group with the fur data, but rather a template of the bulky shape. Far more important than capturing the fur, however, was acquiring the facial data, as “the devil was in the details” of the face, specifically the cheekbones and the eyes: At a climactic point, the heroine looks into the eyes of beast and recognizes them as those of her father. “So it was vital that we had be-



(Above) The CG wolf, created in Softimage, transforms into a CG human, before the real actor steps in. (Right) The virtual actor, as well as his cloak and hat, had to match those of the real actor.



lievable, human-looking eyes, which are seen in close-up during a flashback moment.”

Similarly, the digital cloak had to match the virtual version, particularly in the scenes when half of the garment is real, and the other half is CG. The artists recreated the actual cloak by hanging procedural bits of CG cloth with attached fur onto the virtual actor. In fact, the digital pelt of the wolf was crafted from the same CG fur used to make the coat and hat for the virtual actor. As Docherty points out: “It’s difficult to make a furry garment look dangerous.”

The team built analog strips of the pelts in CG that tore from the skin of the wolf as it turns into the man’s coat and cap. “We originally planned for the wolf’s head to become the man’s head, but the odd shape of the hat made that difficult,” says Docherty. “One day we were experimenting, and we sort of ripped the animal’s head back and had the man’s head emerge from the wolf’s neck region. We all agreed that was very odd. But it grew on us, and eventually it became a big part of the transformation.”

While the wolf proved to be the most challenging in terms of creating the film’s effects, it was not the only creature Peerless had to tangle with for the film. (Assisting Peerless in the film’s effects was Artem.) The artists also crafted the mud mimic, an amorphous creature that swallows children, as well as a host of digital set extensions and other tasks, which added up to more than 800 CG effects shots.

“Typical big, spectacular, LA-style effects are not Terry Gilliam’s style,” says Docherty. “His are more three feet in front of you and disturbing.” To that end, *The Brothers Grimm* were-wolf does not disappoint. ■■

Karen Moltenbrey is an executive editor for Computer Graphics World.

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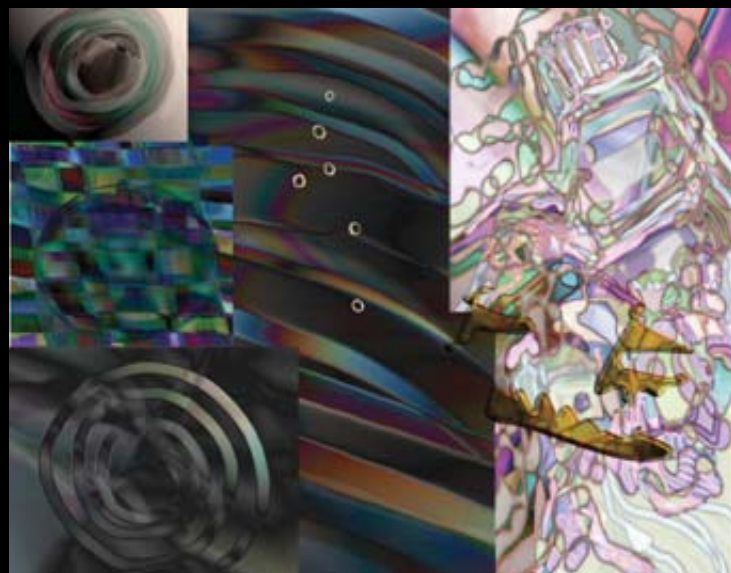
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Portfolio



Clockwise from top:

Serious Anomalies Inspired by the way painter Frank Stella uses layers, Price repeatedly added digital bits and then tweaked them in this image. "Like most of my work now, there is a fifty-fifty split between traditional painting/airbrushing techniques and deliberately bizarre digital creations," says Price.

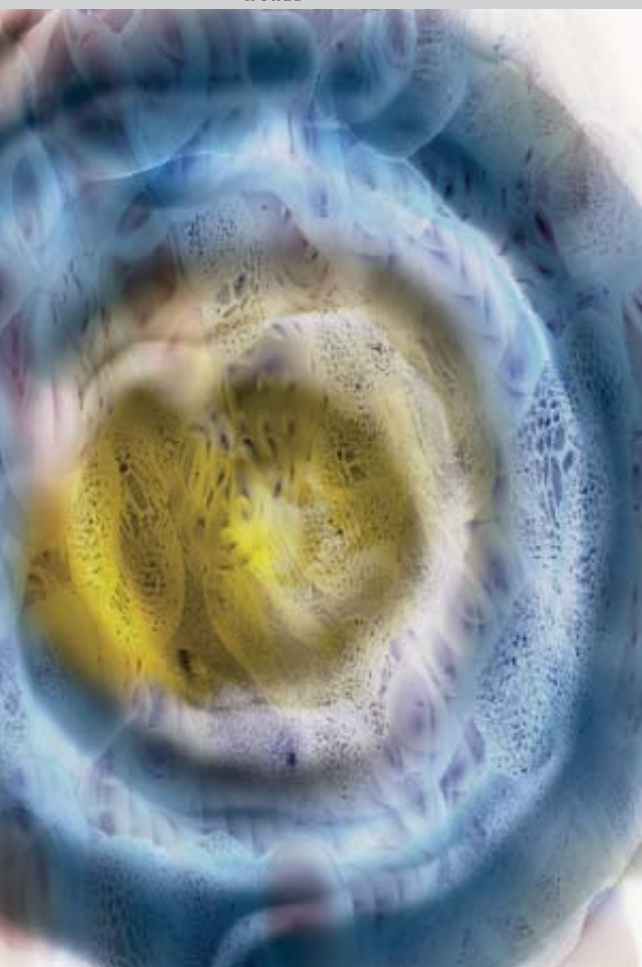
Intelligent Machines This image comprises many effects. "The wheels to the left represent simplistic machinery, which evolve within the center of the work, into conscious, on the right side," explains Price.

Fruit Here, Price gave Impressionism a digital twist: "I wanted the image to look like a traditional oil painting, but not look like one." He did so by adding shadows and a metaphysical surface.

In 1988, professional painter/writer Bruce Price of Norfolk, Virginia, made his foray into the world of digital art. Since then, he has spent more than 6000 hours exploring concepts and ideas using the medium, which has become his exclusive palette.

The advantages of generating art on the computer are plentiful, Price points out. For example, the virtual canvas lets an artist merge images to create something entirely new, and allows a "creative personality" to forge new ideas quickly and focus on the ones that are most appealing. "I've always been an experimental artist; I doodle and hope to get lucky," he says. "The computer is a natural ally to the artistic explorer such as myself."

For his virtual canvas and brushes, the artist uses two Macintosh G4s running ACD Systems' Canvas and, occasionally, Pixologic's ZBrush.



Price, in fact, believes that the future of digital content creation lies within fine art, and to this end, he is trying to show the high-end aesthetic possibilities of the medium. "I start with a blank screen and try to make something I've never seen before. I never use photos or scanned materials, or Photoshop," he says. "I am not competing with other digital artists in so much as I am competing with those in *Artnews* (a fine art magazine). That's why I call my work 'digital painting,' to suggest a continuum with oil painting and more traditional artwork."

During the past year, Price's works have been selected for 35 juried shows, in which he received eight awards. This past summer, he was featured in two solo shows.

A selection of Price's works appears on these pages. More images and information about the artist can be found at www.cgw.com. —Karen Moltenbrey

Clockwise from top left:

Dream Target This piece, made in ZBrush and Canvas, illustrates "a more spiritual version of [painter] Jasper Johns's creations," says Price.

You Have to Wonder This image, which Price contends would have been difficult to create in oils, "is intended to invoke surprise and curiosity, with its contrasting shapes and colors," he notes.

Evasive Typical of his current work, this image consists of several panels surrounding a main image. "It's similar to how painter James Rosenquist creates a large work from smaller ones," Price says.

Rauschenberg Can't Touch This An experiment in digital collage, this selection is so named "as a playful challenge directed at one of my main influences: painter Robert Rauschenberg," says Price.

PAINTING

Corel Painter IX

Corel updates Painter with speed, stability, and creative control

By Dan Rodd and Chris Hipp

As digital artists and content creators, we're longtime users of Painter, Corel's painting and illustration software solution. Like no other program we've used, it provides us with digital materials—paints, brushes, inks, pencils, papers, and more—that closely mimic those used in the traditional creative process. Corel refers to these digital tools of the trade as “Natural Media.”

We installed Painter IX on an Apple Power Mac G5 equipped with dual PowerPC G5 processors, Mac OS X, and a Studio display. We also set up a Wacom Intuos3 pen tablet and 6D Art Pen, as well as Corel's Art Pen Brush Pack, a collection of six brushes designed to take advantage of Wacom's six-dimensional pen stylus.

Painter IX greets the user with a new, clean, and organized welcome screen on start-up that provides quick access to saved files, brush and color-management settings, and tutorials. Like previous versions of Painter, the software ships replete with resources, including libraries of nozzles, brushes, paper textures, stock photos, patterns, and gradients. Provided in electronic format are the User Guide (PDF), Help files (HTML), and tutorial videos. The tutorials, devised by creative professionals, are tremendous assets that impart a wealth of tips we wouldn't get from the user's guide or online help. And the Help system proved faster than in previous versions.

Corel worked with Apple, Intel, and AMD to improve the stability, speed, and performance of Painter. It responds more quickly to brush strokes and key commands. When using previous versions, we often would make a brush stroke and wait, not only for the system to display the stroke, but also for the paint to “dry” or stop running—this was especially true when working with large-size brushes and runny paints. We want to see our strokes in real time, and now that's possible. In general, the brushes are at least twice as fast, but we would like the very large brushes to be more efficient, as a delay is noticeable.

Painter IX's enhanced productivity was evident, especially working with Digital Watercolor. In fact, we seldom opted to use watercolor in previous versions of Painter because it was slow and unresponsive. That system has sped up, and we envision using watercolor far more often now. Painter's newfound stability is obvious; it has not once crashed our system.

The Artist's Oil Painting System equips the brush with a finite amount of paint, lending to more realistic digital artwork. The paint thins out along the stroke, and runs out as we end the stroke. In past versions, the amount of paint laid down throughout the brush stroke was constant, and it ended abruptly where the stroke ended. In the past, we could mix paints in a palette, but not on the actual canvas or paper. We've liked picking up a color from inside the palette, moving it around, and having it interact with other colors, but we couldn't



Painter IX and the Wacom tablet and 6D Art Pen assist Dan Rodd in adding depth to his eye-catching imagery.

find a way of actually doing that on the artwork. Now paints blend together on paper, as they would in the physical world.

On the topic of paints, Digital Watercolor is great in Version IX. At any time, we could start a new layer, add as many layers as we like, and edit them by making one more transparent than another, for instance. And we could use a command for drying the paints, or we could leave them wet and complete the painting later. In short, Digital Watercolor is more forgiving than it was in past incarnations.

Painter IX offers various image effects. For turning photographs into paintings, Quick Clone worked well and quickly, in a single action. As for filters, there's all kinds and they can be layered. And Version IX marks the first time the following KPT effects plug-ins have been included with Painter: KPT Gel, KPT Goo, KPT LensFlare, KPT Lightning, KPT Pyramid Paint, KPT Reaction, and KPT ShapeShifter.

Painter has the blessing and the curse of having a million options. It takes a while to familiarize yourself with all of them, their customizable attributes, and how they interact. Painter IX gives you as much control as you'd ever need. It's easy enough to get started and do decent work, but it takes time to become accomplished. It's an ongoing adventure. ■■

Dan Rodd and Chris Hipp are professional illustrators well versed in a wide variety of digital imaging solutions.

Painter IX

stats

Price: \$229 (\$199 as an upgrade)

Minimum System Requirements:

Windows 2000/XP running on a Pentium II 500MHz system or Mac OS X on a Power Macintosh G3 500MHz, 128MB of RAM, 380MB (395MB on Mac) of hard disk space, a 24-bit color display with 1024x768 resolution, a CD-ROM, and a mouse or tablet.

Corel Corporation
www.corel.com

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SIGGRAPH 2005



Editors' Picks

By Courtney E. Howard, Senior Technical Editor

The staff of *Computer Graphics World* recently ventured to Los Angeles for SIGGRAPH 2005, from which the editors returned with information about a wealth of new products. Upon its return from the show, the editorial staff, including contributing editor George Maestri, submitted individual votes for the hottest and most innovative products introduced during the well-attended industry event. These two pages highlight the Editors' Picks for SIGGRAPH 2005.

*Endorphin 2.5

Endorphin 3D character animation software incorporates NaturalMotion's Dynamic Motion Synthesis (DMS), technology that simulates the human nervous system using artificial intelligence controllers. Endorphin taps a system's CPU to imitate the brain and body of 3D characters, and thereby bring about more natural, lifelike, and interactive movements.



"NaturalMotion's Endorphin is innovative in its approach to motion," notes Karen Moltenbrey, executive editor. "And Version 2.5 gains a wealth of enhancements, such as improvements in the areas of transitions, dynamic blends, character rigs, and file support."

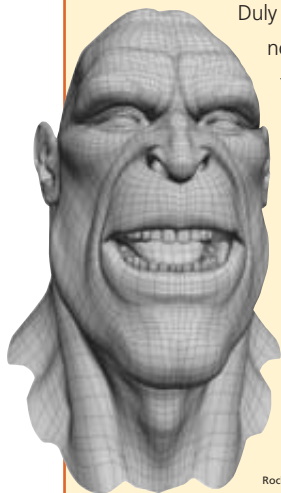
www.naturalmotion.com

*Face Robot

The public's increasing demand for realism in films and games has cast a spotlight on the need for more detailed, varied, and accurate facial and hand animation. It's no wonder, then, that Softimage's new facial animation technology drew so much attention from SIGGRAPH attendees.

Duly impressed by the technology preview was contributing editor George Maestri. "Softimage Face Robot could revolutionize the way faces are rigged," he recognizes. Built on a computer model of facial soft tissue, it mimics a vast range of human emotions.

www.softimage.com



Rock Falcon © 2005 Avid Technology Inc.

*BrightSide DR 37P

During SIGGRAPH, BrightSide Technologies launched DR 37P, considered to be the world's first extreme dynamic range display. The BrightSide DR 37P, a 37-inch extreme dynamic range monitor, is well suited to film, postproduction, game development, and other environments in which it is critical to view images in minute detail. The new release delivers 10 times the brightness and 100 times the contrast of traditional displays through the employ of an LCD panel and LED backlights.

www.brightsidetech.com



*NEC SpectraView LCD2180WG

Following preproduction testing by such companies as DreamWorks and Adobe, NEC Display Solutions unveiled the SpectraView LCD2180WG professional-grade display targeted at high-end digital animation, film, video, and photo-editing and production environments. The 21-inch flat-panel LCD monitor sports an LED backlight to achieve a high level of image detail, color accuracy, and brightness uniformity.

www.necdisplay.com



*ASHLI for Maya

ATI Technologies' Advanced Shading Language Interface (ASHLI) has been incorporated into Alias's Maya 7. Saving time and increasing productivity, ATI's real-time interactive shading technology harnesses the power of the ATI GPU and Maya Shading Network to produce and display photorealistic, shader-rich imagery

and environments. Users can view a final render in shaded mode, make adjustments before the final render, manipulate shaders, and preview changes in real time. The ASHLI plug-in is provided in Windows and Linux versions of Maya 7. Autodesk Media and Entertainment's 3ds Max 7 and later versions support ASHLI.

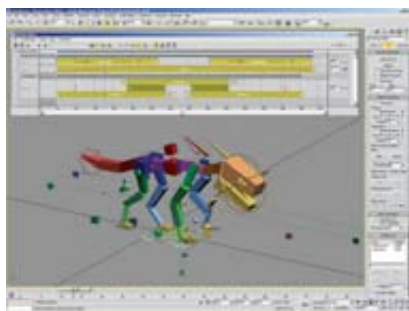
www.ati.com



*3ds Max 8

In the past few years, SIGGRAPH has carried with it news of a new version of 3ds Max, and this year's event was no different. Autodesk Media and Entertainment released Version 8, complete with enhanced character development, texturing, data and asset management, and software development kit (SDK) tools. "The new motion mixer, cloth, hair, UV pelt mapping, and rendering features help to make 3ds Max 8 one of the most complete and easy-to-use 3D modeling, animation, and rendering packages on the market," announces Maestri.

www.autodesk.com



*Maya 7

Seven proved a lucky number for Alias, with the launch of Maya 7 and MotionBuilder 7 at the show. Maya 7 gains MotionBuilder's full-body IK technology, increasing the speed, ease, and accuracy with which artists animate models. The upgrade sports new polygonal modeling, illustration, visual effects, and render layering tools and technologies. "The integration of MotionBuilder technology within the Maya environment enables character animators to move between the applications easily, and streamline work flow," says Kelly Dove, editor in chief.

www.alias.com



*LightWave 64

During SIGGRAPH, NewTek released the 64-bit port of LightWave 3D for Windows XP Pro x64 OS, leveraging the memory and processing power of 64-bit systems. In addition to productivity gains, artists benefit from the ability to create more complex, realistic, and high-resolution images and scenes. A new LightWave 8.5 update provides faster OpenGL performance, support for OpenGL hardware shaders, enhanced dynamics and particle systems, and a SuperMultishift tool in the Modeler. LightWave 64 and the update to Version 8.5 are free to LightWave 8 users.

www.newtek.com



*RenderMan for Maya

Pixar makes its PhotoRealistic RenderMan rendering technology readily available to a larger audience with the release of its RenderMan for Maya plug-in, an affordable, seamlessly integrated alternative to the company's high-end RenderMan Pro Server and RenderMan Artist Tools. "Not simply a 'lite' version, RenderMan for Maya was built from the ground up to be feature-rich and easy to use, and to infuse the Maya work space with Pixar's powerful rendering technology," acknowledges Courtney E. Howard. For Macintosh OS X and Windows XP, RenderMan for Maya is priced at \$995.

www.pixar.com/renderman

*Gelato 2.0 with Sorbetto

"Could moving rendering tasks to the video card be the future of rendering? With the release of Gelato 2.0 and Sorbetto, it's evident Nvidia thinks so," says Maestri. Nvidia has upgraded its Gelato rendering software with enhanced performance and new features and functionality, including volumetric shadows for hair and smoke and the ability to simultaneously render stereo imagery. At the same time, Nvidia introduced its Sorbetto lighting tool that works in conjunction with Gelato. Sorbetto enables artists to add, remove, move, and modify lights before final rendering and view the effects of such changes interactively, in real time and in the final pixels. The lighting technology also is designed to accelerate lighting processes and aid users in achieving realistic lighting and in making a scene look exactly as they desire.

<http://film.nvidia.com>, www.nvidia.com



Honorable Mentions

With a large number and wide breadth of products introduced and presented at SIGGRAPH 2005, it proved difficult to limit the Editors' Picks selections to 10. The following products, having just barely missed the Top Ten list, are nonetheless very worthy of industry attention.

Vicon MX with g-speak; www.vicon.com

Pre-Viz Version 2; www.antics.com

Massive Jet; www.massivesoftware.com

Houdini 8; www.sidefx.com

Digital Fusion 5; www.eyeline.com

CAT2; www.catoolkit.com

AGEIA PhysX; www.ageia.com

4U MC workstation; www.bboxtech.com

products

For additional product news and information, visit

www.cgw.com

SOFTWARE

3D CHARACTER ANIMATION

CAT2 Debut

Win Character Animation Technologies Ltd. has unveiled Version 2 of its CAT (Character Animation Toolkit) plug-in for Autodesk Media and Entertainment's 3ds Max. Designed for game development, film, and television artists, the newly upgraded character system boasts Time Warp curves, for controlling the speed of an animation layer with one spline curve, and a Stretchy Bones mode, in which users can lengthen bones in the viewport and animate the scale of all rig bones. Version 2 also gains

a new rig manipulation system with

FK/IK, a foot pivot system, support for a greater amount of bones, and the ability to create and edit proxy meshes and save them as rig presets. It also supports the importation of motion data files in HTR, BVH, FBX, and BIP formats. CAT2, now available for 3ds Max, is priced at \$995 for new users and \$295 as an upgrade.

Character Animation Technologies Ltd.; www.catoolkit.com

PANORAMA

Wide-angle Artwork

Win • Mac RealViz has begun shipping Version 5 of its Stitcher professional-level panorama software, designed for multimedia and 3D artists, photographers, and architects. Stitcher aids users in creating wide-angle panoramas for 3D, film, Web, and print projects, and interoperates well with Adobe Photoshop. Version 5 incorporates a new user interface, a full-screen 3D window, and a fully automatic stitching engine. Other new features include 3D stencils, manual control points, QuickTime VR scripts, a live preview, and render-set and shortcut management tools. Stitcher 5 is priced at \$580 for the full version, \$250 as an upgrade from Version 4, and \$290 for users of earlier editions.

RealViz; www.realviz.com

VIDEO

Canopus Codec

Win • Mac Canopus has previewed its third software codec option for its Edius Pro 3 nonlinear editing solution, the Canopus HQ+. The

new software codec is specifically designed for such quality-critical applications as compositing and 3D animation. By way of 4:2:2 color sampling, the HQ+ captures 1920 luma samples and 960 chroma samples per line to produce a 1920x1080i (interlaced) frame, which

is said to offer quality comparable to uncompressed HD at roughly 20 percent the data size. The Canopus HQ+ software codec, scheduled to begin shipping this quarter, does not scale the image, and thereby retains the original picture sharpness, contrast, and detail.

Canopus; www.canopus.com



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