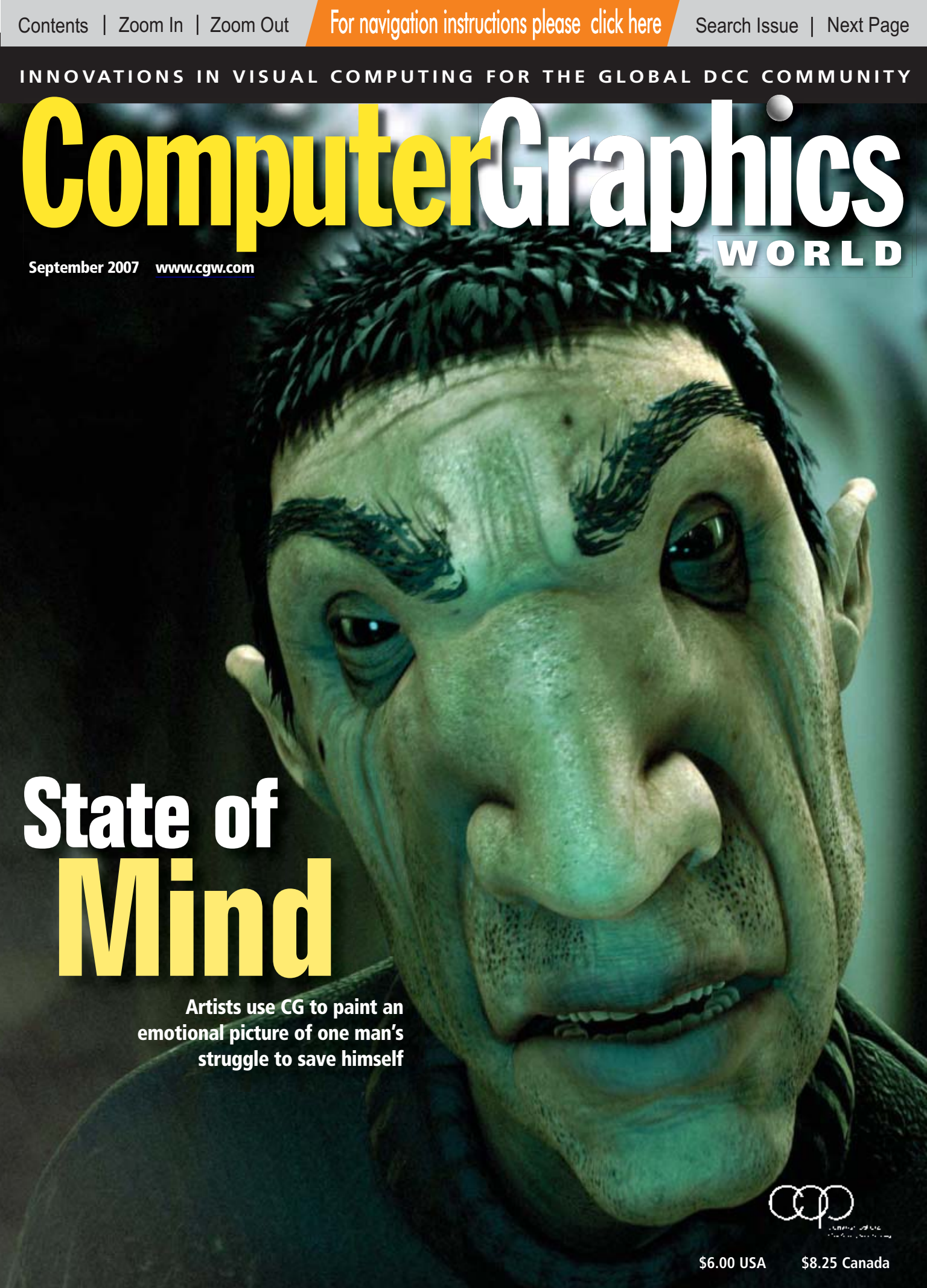
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September 2007 www.cgw.com



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editor'snote



Karen Moltenbrey
Chief Editor

The Quest for Learning

September is here, and with it comes the start of a new school year. Turning back the clock (for some, myself included, this requires a few extra revolutions), most of us can recall getting ready for our elementary years, shopping for school supplies and our new lunch box—the metal sort, with images of our favorite television show or superhero. During our pre-teen and teen years, we knew that summer was winding down when our parents bought us back-to-school clothes that we weren't allowed to wear until that early September morning (perhaps this was a bigger event for girls than it was for boys). In high school, summer seemed to end in July, as August was reserved for all-day practices—band, cheerleading, football, soccer, and so forth—as teams readied themselves for fall sports.

Today, Sketchers have replaced penny loafers, backpacks have replaced book bags, and stretchable book socks have replaced paper book covers. Yet, the quest and need for learning has remained the same. We are taught early on that education is important. In elementary school, we must learn to read and write. In junior high, we expand our knowledge of the basics and venture into other, more unique subjects. In high school, we prepare for college or a trade. In college, we prepare for "the real world," which means a professional career. But, what happens then? Does the pursuit of knowledge stop when we obtain our diploma? For some, the answer may be "yes." But in the digital content creation realm, such a decision could lead to career suicide, particularly in today's ever-changing electronic age.

DCC professionals have many options, both traditional and nontraditional, when it comes to furthering their education.

In the early days of computer graphics, digital artists were 90 percent computer programmer/10 percent artist. While there are exceptions, most digital artists and animators today have advanced their skills at an art school or a university specializing in CG techniques. For those who require a non-traditional classroom setting, online schools, such as Animation Mentor, are providing students with the appropriate knowledge and skills required to obtain a job in the DCC industry. Yet, when this initial round of learning is complete, there are a number of alternatives for expanding one's knowledge.

Of course, there are countless books available to teach the art of modeling and animation. Additionally, a plethora of publications detail how to use a particular tool—XSI, Maya, Photoshop, and so forth. There are also a number of non-traditional alternatives. Facilities like 3D Garage and DV Garage offer digital training solutions that allow artists to extend their skill sets into other areas of CG, whether it is modeling, compositing, texturing, or animating. Recognizing the need for CG artists to become proficient at using a variety of tools, Digital-Tutors, Class on Demand, and others offer programs for mastering just about any type of commercial CG software. Vendors such as Autodesk and Softimage also provide training centers, training materials, and books detailing how to use their products. Even animation studios like DreamWorks hold classes to teach new hires to use their preferred tool sets.

We at *CGW* also recognize the importance of education, and as a result, we have launched our Knowledge & Career section, with the goal of providing our readers with information that will enable them to advance in their careers. ❖

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The Magazine for Digital Content Professionals

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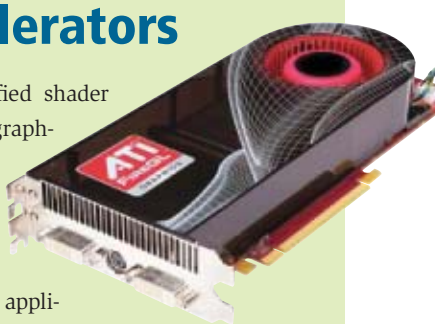
NEWS FROM siggraph 2007

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PRODUCTS

GRAPHICS CARDS

AMD Unleashes ATI FireGL Series Accelerators



AMD unveiled five new high-performance ATI FireGL workstation graphics accelerators for CAD, DCC, and medical imaging professionals. The ATI FireGL V8650, FireGL V8600, FireGL V7600, FireGL V5600, and FireGL V3600 graphics boards are based on the next-generation ATI graphics processing unit (GPU) with a unified shader architecture featuring up to 320 individual-stream processing units. These new boards deliver acceleration of DirectX 10- and OpenGL 2.1-based professional applications, resulting in increased performance of more than 300 percent compared to the previous generation.

Several key features distinguish the new series of ATI FireGL workstation graphics boards. An industry-first of 2GB of onboard memory enables engineers and designers to interact with larger datasets and more complex models, while the ATI FireGL unified shader architecture maximizes graphics throughput. AMD's unique AutoDetect feature instinctively optimizes the graphics driver based on the user's specific software applications, even while running multiple programs simultaneously. With AutoDetect, end users are no longer required to manually adjust application-specific settings, even when toggling between different applications.

The new series of ATI FireGL accelerators are expected to begin shipping this month. The V8650 (2GB) costs $2799; the V8600 (1GB), $1899; the V7600 (512MB), $999; the V5600 (512MB), $599; and the V3600 (256MB), $299.

PRODUCTS

3D IMAGERY

Dassault Shows New Technologies

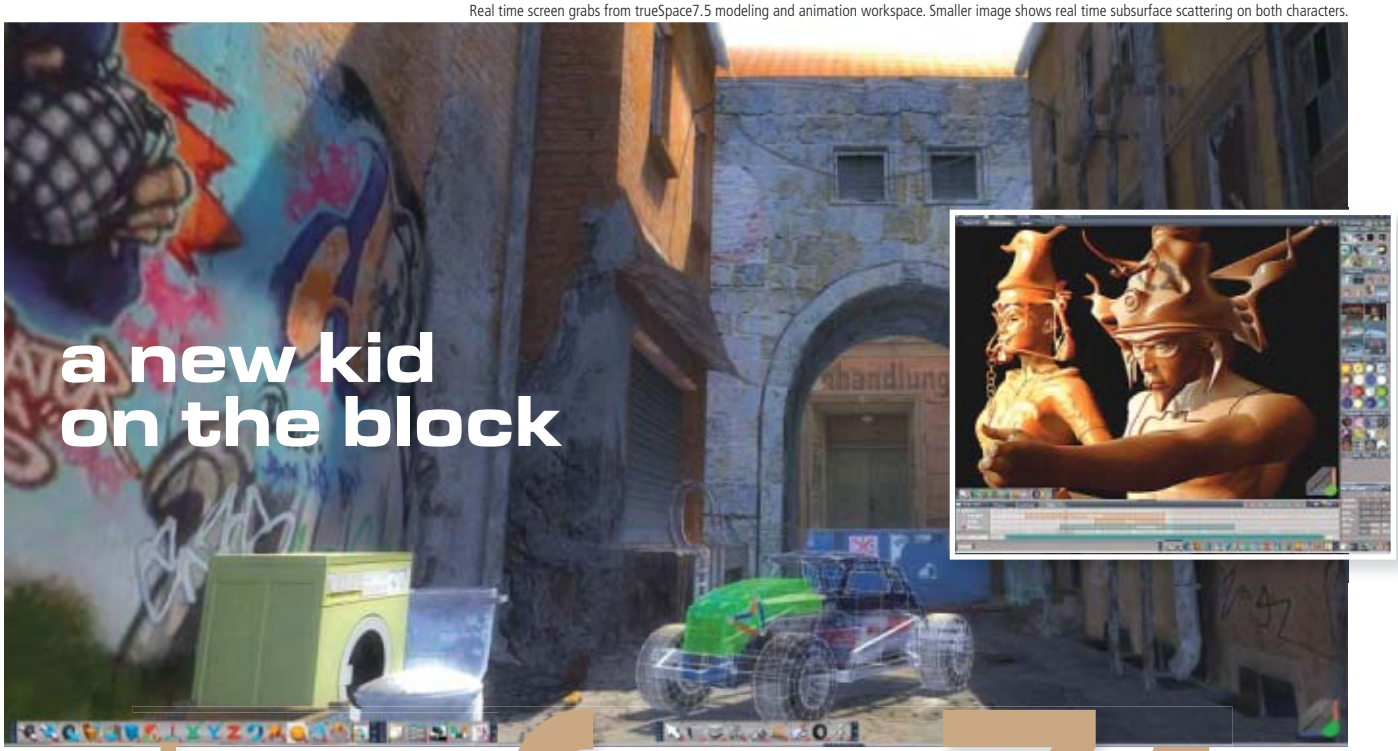
3D and product life-cycle management solutions vendor Dassault Systèmes demonstrated its new technologies and strategies that further position 3D as a universal language of product development.

First, the company showcased 3DVIA, introduced in June, which will allow even novice users to invent and create objects in 3D, as well as upload, share, and tag 3D imagery for interactive, lifelike experiences. Part of this strategy includes Dassault's 3DVIA Virtools entertainment solutions for game developers. 3DVIA will be available in the near future.

Second, Dassault teamed up with Nvidia and Mental Images to extend sophisticated shader authoring technology to users in the digital mock-up review process. This wider access to shading tools within the Dassault line enables companies to create richer, more detailed simulations that yield higher quality 3D renderings that are reflective of the real world. As a result, Dassault's Real-Time Rendering solutions, complemented by Nvidia's FX Composer 2.0 and Mental Images' Mental Mill shader technology, can produce accurately perceived aesthetics during the design phases.

This next generation of shader functionality in Catia, Enovia, and Delmia—which is compliant with Nvidia CgFX shader technology and OpenGL—offers high-quality rendering to CAD users and technical artists accustomed to working in the DCC world. It enables them to create more realistic simulation renderings in the conceptual design phase, and institute design changes and modifications early in the process, where it is easier and more economical to do so.

Real time screen grabs from trueSpace7.5 modeling and animation workspace. Smaller image shows real time subsurface scattering on both characters.



trueSpace7.5

	trueSpace7.5	CINEMA 4D R10		3ds Max	SOFTIMAGE|XSI		Maya	
		CORE	Studio		Foundation	Advanced	Complete	Unlimited
Fully Customisable Interface	●	●	●	●				
Multiple Rendering Engines	●			●			●	●
Advanced Rendering (GI, HDRI, caustics)	●		●	●	●	●	●	●
Photo-realistic workspace	●							
Advanced Modeling (Poly, SDS, NURBS)	●	●	●	●	●	●	●	●
Surfacing (UV editor)	●	●	●	●	●	●	●	●
Advanced 3D Paint		●	●				●	●
Normal and Displacement tools	●	●	●	●	●	●	●	●
Hair / Fur	●		●	●		●		●
Dynamic Hair / Fur			●	●		●		●
Non-linear Animation Tools	●	●	●	●	●	●	●	●
Skeletons with full body IK	●	●	●	●	●	●	●	●
Interactive Physics characters	●							
Fluid Dynamics and Cloth			●	●		●		●
Motion Data Import	●	●	●	●	●	●	●	●
Procedural Animation	●	●	●	●	●	●	●	●
Generalized Node Editor	●							
Undo With Construction History	●	●	●	●	●	●	●	●
Support for Multi-core CPU's	●	●	●	●	●	●	●	●
Real time 3D Collaboration	●							
Free Interactive Web Viewer	●							
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PRODUCTS

MODELING•ANIMATION

Softimage Debuts XSI 6.5, Face Robot 1.8



At SIGGRAPH, Softimage released the latest versions of its 3D animation software packages: XSI 6.5 and Face Robot 1.8.

The company also announced plans to repackage its Essentials and Advanced versions of XSI 6.5 with features and pricing that meet the specific needs of artists and studios, respectively. The Essentials and Advanced versions will include more than 30 enhancements developed for key customers such as Lionhead Studios, Valve, EA, Animal Logic, and NCSoft for improved production efficiency and specific workflow needs. These include HDR rendermap support, UV edit enhancements, and more.

The Essentials version, for artists, now includes Hair & Fur and Syflex Cloth capabilities. The price for Essentials will increase to $2995, and XSI 6.5 Essentials will only be available to new customers and those on active maintenance. Advanced, geared for TDs and facility managers, contains all the features of Essentials, plus other tools such as Behavior, a crowd and behavioral simulation system, as well as five additional XSI Batch rendering licenses. Pricing for Advanced will decrease to $4995. XSI 6.5 is expected to be available this fall.

Meanwhile, the latest version of Face Robot will offer enhancements for game development pipelines, along with hours of new training material. The software package delivers fast lifelike 3D character facial animation for use in games, film, and television. A number of the new features focus on game development pipeline efficiencies, including: crosswalk, motor, delta referencing, and animation layers. A new shape-rig export system allows users to export entire head blendshapes for use in XSI and Autodesk Maya software, while an improved game export pipeline offers auto-enveloping, which delivers more accurate and higher quality results. The product will be available at the end of the month; pricing, which depends on project and user requirements, begins at $6000.

PRODUCTS

TEXTURING

Allegorithmic Unveils ProFX 2.6 Middleware

Allegorithmic announced ProFX 2.6, the newest version of its procedural texturing middleware. Featuring a newly optimized core that runs faster and on a wider range of machines, ProFX 2.6 allows game developers to author and render high-quality procedural textures. The tool is compatible with Pixel Shader 2.0, thereby maximizing the number of machines that benefit from GPU acceleration.

Designed for use with MapZone Pro 2.6, the texture authoring software lets game studios produce texture assets up to two times faster than with regular techniques. The tool's procedural texture files are very small in size—typically 500 to 1000 times smaller than regular textures—making them ideal for use in massively multiplayer online games, virtual communities, and casual and downloadable games.

ProFX 2.6 is scheduled to ship in the fall. The software's pricing models vary based on the type of game and development platform.

PRODUCTS

ANIMATION

Toon Boom's Digital Pro Simplifies Animation

Toon Boom Animation released Toon Boom Digital Pro, the company's latest professional animation software. Packaged in an easy-to-use interface, Toon Boom Digital Pro is complete animation software for advanced content creation, animation, and compositing.

The program contains a vector engine, a management tool for creating color models with independent palettes that can be changed in real time during production, an automated lip-sync function, a rigging capability for automatically morphing in-betweens and creating IK, and more, including kick-start programs and training materials. And, its true-3D space feature allows users to place elements at different depths and automatically preserve the perspective with the real-time multiplane camera.

Toon Boom Digital Pro ships in three versions: commercial, educational, and personal learning edition. Toon Boom Digital Pro sells for $2999 and is available online at www.toonboom.com/products/digitalpro.



Ice Plane image supplied by Saddington & Baynes CGI. Photography by Darran Rees.

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PRODUCTS

MODELING•ANIMATION

Autodesk Rolls Out Its 2008 DCC Line

Autodesk made quite a splash at SIGGRAPH, introducing its latest product versions, as well announcing its intention to purchase Skymatter, makers of the Mudbox 3D brush-based modeling software.

The company announced Maya 2008 modeling, animation, visual effects, and rendering software, including a Mac OS X version, with a focus on improved workflow efficiency. Designed for multi-core workstations, the 2008 release provides new creative tools for faster and easier modeling and animation. It offers increased polygon modeling efficiency through a streamlined Mesh Smooth workflow, a new Slide Edge feature, and improvements to Booleans, Bridge, Bevel, and other tools.



In the gaming arena, Maya 2008 is now better equipped to create and display content destined for the Wii, Xbox 360, and PlayStation 3 consoles with support for DirectX HLSL shaders in the Maya viewport, a new hardware shader API, enhancements to the render view, accelerated Mental Ray texture-baking performance, and more.

The software also delivers improved skinning and rigging tool sets, including new, non-destructive skin editing capabilities so animators and TDs can efficiently explore ideas through iterations. Maya 2008 is expected to be released this month at $1999 for Maya Complete and $6999 for Maya 2008 Unlimited.

Autodesk also showcased its 3ds Max 2008 software. Highlights of the new version include improved viewing and handling of large, complex scenes through a revamped viewport, a new Scene Explorer, which provides a hierarchical view of scene data, as well as fast scene analysis and editing tools. In addition, a new user interface offers a less menu-dependent modeling experience. A Review toolset provides iterative rendering workflows with interactive previewing of shadows, the 3ds Max sun/sky environment, and architectural and design material settings. The software also touts several Mental Ray workflow improvements, including a new Sky Portal, which simplifies lighting indoor scenes using outdoor lighting and supports HDRI-based lighting effects. 3ds Max 2008 should be available next month for $3495.

The company also announced the second extension for its MotionBuilder 7.5 software, with new features and functionality, including faster plotting and scene evaluation, as well as additional platform support for the Intel-based Macintosh and the 64-bit Windows XP operating systems. The extension is available via download for all MotionBuilder Platinum members.

PRODUCTS

RENDERING

Boxx Announces RenderBoxx Render Farm Series

Boxx Technologies revealed its new RenderBoxx Render Farm, ideal for studios where space is at a premium. RenderBoxx 10100 modules are compact renderfarm building blocks that leverage the Quad Core Intel Xeon architecture to provide rendering power coupled with power-saving efficiency and scalability. A single RenderBoxx 10100 module delivers the rendering power of four Quad Core Intel Xeon processors in a configuration that easily scales to meet the needs of VFX studios. Twenty Quad Core Intel Xeon processors fit in just four Us, while a full rack of RenderBoxxes features 200 Quad Core Intel Xeon processors—a total of 800 cores.

The RenderBoxx Render Farm series also features advanced IPMI 2.0 technology for worry-free renderfarm monitoring and control, and a front-accessible design that enables easy connections and efficient networking.

The new RenderBoxx Render Farm series will be available soon; base pricing for a node with four Quad Core Intel processors starts at $5410.

Blackmagicdesign



New Intensity Pro introduces HDMI with analog editing in HD and SD for $349



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$349

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spotlight

MODELING

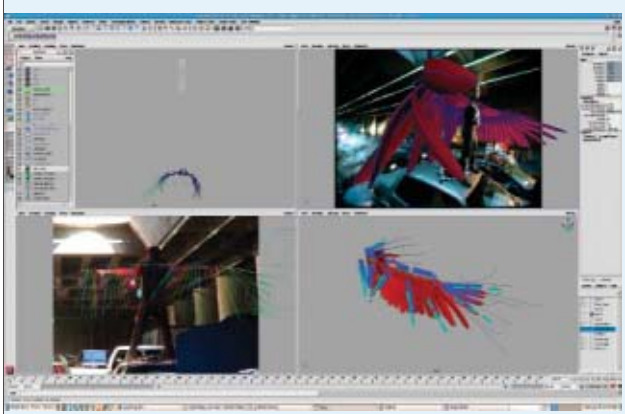
USER FOCUS

Digital Technology Takes Flight

In a recent spot for Honda Motorcycles, a frustrated driver punches through the roof of his car in bumper-to-bumper traffic, sprouts wings, and flies to open-road heaven with help from detailed 3D and effects work by the Brickyard VFX CG team.

The spot opens on an overhead shot of cars driving through gridlocked traffic while horns are heard honking through an underpass. An impatient driver punches a fist through the roof of his sedan, tears open a hole, and climbs through to stand on top of his car. Almost immediately, the man's arms extend out into bright-red, hawk-like wings that propel him up and out through an opening in the overpass, as the tag line "Free Yourself" appears on the screen. The scene then transitions into a shot of the liberated driver speeding away on his Honda motorcycle.

The Brickyard VFX CG team, led by Robert Sethi and Yafei Wu, got involved in the project during the early stages, designing the wing effect and providing on-set VFX supervision; lead Flame artist Patrick Poulatian also supervised



the shoot. The team opted to create the wings entirely in CG since the director wanted them to look real, predatory, and large enough to realistically propel a grown man into flight. Practical wing props were too small and fluffy, and since they're largely made of turkey feathers, they didn't create a wingspan that was broad or wide enough.

The team worked closely with the director on set and in casting to design a wingspan that would suit the performer; the resulting CG wingspan spread 16 feet across when composited onto the actor and fully extended. The color of the wings was chosen to denote the red wing of the Honda Motorcycles logo.

"On set we [established] witness cameras at different points around the actor to capture him from all sides and ensure that our CG would match perfectly into the live-action



plates," explains Sethi. "We've worked with Kinka [Usher, of House of Usher] before, and he gave us a lot of latitude during the shoot to ensure that we documented everything needed in order to seamlessly integrate the 3D animation and 2D live action. We even worked with Kinka to choreograph the actor on set, how he should bend and move his arms, and, most importantly, the timing of his movements to maximize the impact of the effect in the final spot."

Photography from Eadweard Muybridge's *Animals in Motion* book proved inspirational in defining the wing extension. Hawk photography and stock footage also was utilized as reference for the movement of the performer. During the shoot, the team took extensive "gray ball" photography on set (still photos of a gray ball that provide lighting directional data to digitally reproduce accurate CG facsimiles of the live-action light and shadows), which helped lend to the highly photoreal quality of the final render.

The artists built the wingspan rig in Autodesk's Maya, using Maya Fur to generate the feathers for the softer parts of the span. The group also used procedural animation to make the smaller feathers flutter independently. To render the final images, the team employed Pixar's RenderMan. "We like customizing all our 3D work, and Maya and RenderMan allow us to do that," notes Wu. "With MEL scripting and RenderMan Shading Language, it's easy to write and customize animations without having to code in C++. We usually write our own custom shaders and scripts on each job."

And with these techniques, the project was off and flying high. ❖

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viewpoint Animation

3D Precision in Mocap

By Brian Nilles

For years, suppliers and users of motion-capture hardware and software have been striving to make mocap a mainstream production tool. The technology certainly has reached broad market acceptance in the 3D entertainment world, simply because of its ability to provide compelling signature motion at a lower cost than traditional keyframe methods—but it was a long road. The early adopters in the mid-1990s accepted significant shortcomings in the core technology, but were still able to use it to their advantage to help tell stories.

Revolutionary production feats in motion capture for major films was taking place as far back as 1997, with *Titanic*. Today, directors Robert Zemeckis and James Cameron are shifting paradigms in modern filmmaking with their groundbreaking 3D productions, which take full advantage of motion capture. Facilities such as Sony Pictures Imageworks and Industrial Light & Magic are also perpetuating leaps in mocap development with work on films such as *Beowulf*, *Monster House*, and *The Polar Express* from the former, and *Van Helsing*, *The Hulk*, and the *Pirates of the Caribbean* series from the latter.

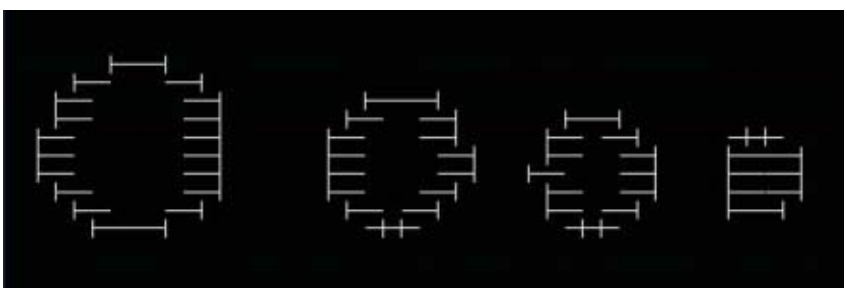


Brian Nilles
is chief executive officer of Vicon Motion Systems.

For filmmakers, motion capture promises bigger, better, faster, and cheaper.

Features such as *Happy Feet*, *The Lord of the Rings* trilogy, and *King Kong* have also utilized motion capture to help tell their story. In all these recent cases, motion capture offers a clear method of producing economical and compelling character animation for visual effects and CG filmmaking.

What does the future hold for filmmakers who embrace motion capture? The answer is as easy as looking at the history of the technology—bigger, better, faster, and cheaper. More specifically, we'll continue to see much more extreme cases of existing production achievements—larger capture areas, higher precision, simultaneous face and full-body capture, first-unit-friendly equipment, and, as always, more performers, more cameras, more markers, and more automation.



A thresholded image using a 4MP (megapixel) camera. The white "video" lines detect the presence of a marker. However, the centroid calculation requires a "best fit circle" approach, which is prone to significant error.

Advanced Motion Capture Today

There are several motion-capture technologies available, but by an order of magnitude or better, passive optical systems are the mainstay of entertainment production teams. This is true for all sectors of visual entertainment, including video games, film, commercials, music videos, and broadcast. Why is this so? Primarily because the performance that passive optical systems offer, with respect to quality, speed, and price/performance, overshadow the alternatives.

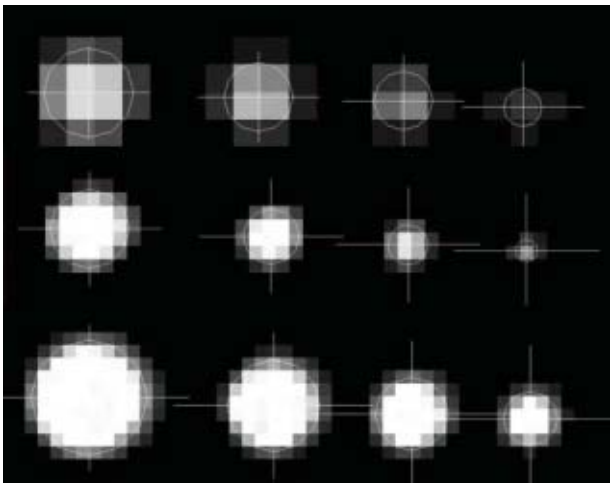
So what makes passive optical systems the broadly accepted standard? There are several reasons:

- **Precision.** Artifact-free motion data reflects the nuance and signature motion required to suspend disbelief and entertain audiences.
- **No technology on the performer.** Nothing to break, recharge, synchronize, or otherwise worry about on set—just reflective markers.
- **Ability to capture in large areas.**
- **Ability to capture hands, face, and full-body performances simultaneously.**
- **Ability to capture the camera track, in addition to the character motion.** This provides the director with a real-time preview of the scene.
- **Integration with other production-standard equipment.** This includes electronic slating, genlock, and time-code support, reference video, and more.
- **Production-proven pipelines.** These range from marker capture to skeletal solve or to retargeted skeleton, or to final output to any animation package.

The bottom line is that optical systems offer a workflow that most closely mimics live-action shooting methods, thereby enabling film directors to transition into 3D production without having to learn a whole new process.

3D Precision: Camera Resolution and Grayscale

One of the most significant differentiators in the overall performance of premium systems is 3D precision. The highest precision systems reduce or eliminate artifacts associated with the capture technology, thus reducing the amount of cleanup, filtering, or other issues that can dramatically affect final character animation. These premium systems also are capable of viewing markers that are much farther away from the motion-capture cameras, thereby enabling artifact-free animation, even in very large performance areas.



(From left to right) A 14mm, 9mm, 6.5mm, and 3mm marker seen from a 0.3MP camera (MX3+ at the top), a 2.0MP camera (F20 in the middle), and a 4.0MP camera (F40 at the bottom). The higher-resolution cameras also can see smaller markers farther away.

3D precision can be affected by a number of things, but by far two of the most important contributors are camera resolution and the use of grayscale image processing. Quite simply, for a given marker size and field of view for the motion-capture camera—and at a given distance from the marker to the camera—the more pixels there are to describe the marker in the camera image. This also means we'll be better able to calculate the centroid, or center point, of the marker. In summary, the better the centroid calculation, the better the 3D position calculation, and the more accurate the capture data.

That sounds easy—why not just use bigger markers to cheat your way around resolution? There are several reasons why that is not an ideal solution. Larger markers are far more distracting to performers, they tend to move more than smaller markers, and they cause more discomfort for performers who are doing stunt work. As an example, it is very common for a director to capture the facial and full-body performance of an actor, and facial markers are typically between 2mm and 4mm in diameter. Only the highest-resolution cameras are capable of accomplishing this in a useable performance area.

OK, what about image processing and its effect on 3D precision? Older systems from Vicon and existing systems from other manufacturers often use a "thresholded" image, rather than the "grayscale" image, to calculate the centroid. The difference in 3D precision offered by the two methods is quite different. Our tests for cameras in which all other things were equal (camera resolution, marker size, camera-to-marker range) showed an improvement in 3D precision of 8x when moving from a thresholded method to grayscale image processing.

Where is the magic here? As is the case with camera resolution, the goal is to get the most accurate centroid calculations for better-quality mocap data. A thresholded image detects only the brightest images in the scene (as it should be), but each pixel's value can only be "yes" or "no" when answering the question as to whether a marker is present or not.

Grayscale processing is very unique and enables Vicon cameras to achieve extremely accurate centroid calculations and resulting 3D data. With grayscale processing, each pixel describing a marker can have one of 256 shades of gray (or values) to describe its intensity. The centroid calculation uses the "weight," or value, of each pixel, defined by its shade of gray, to influence the centroid calculation of the marker. This offers a dramatic improvement in 3D precision; in addition, it removes many artifacts that are present when markers overlap in a camera view or touch each other during capture.

Looking Ahead

Years ago, we saw that third-party camera manufacturers were clearly unable to produce the resolution needed to satisfy the growing markets, so Vicon started designing and manufacturing its own cameras, starting with the MCam in 1998. The MCam, along with several subsequent cameras, have led the industry in speed, resolution, and, ultimately, 3D precision.

Between then and now Vicon has produced a dozen different camera types to help its clients tackle their most complex production challenges. In early April, the company hit another significant milestone. Sensor manufacturers were falling well behind on the company's future requirements, so we began producing our own sensors (coined the Vegas sensor) and have launched these with the latest Vicon technology—the F40 and F20 camera types (see the Products section, May 2007, pg. 4).

This new sensor combines high-resolution, very high speed, and true freeze-frame shuttering in a single package—and again, it's the highest specification camera of its kind, inside or outside the world of motion capture. It runs 4MP and has the ability to operate at full resolution up to 370 fps, while its shuttering makes it far more resistant to high-inten-

sity studio lighting—an important feature for combined CG/live-action work.

The sensor also meets the specific requirements of moviemakers: The motion-capture system is friendlier to use on set, and it even enables the shooting of live action and motion capture simultaneously.

It used to be that movie crews had to be instructed on how to operate with motion-capture equipment present, which is quite the opposite hierarchy demanded by crews. "Don't bump into a camera," "Wait, we need to recalibrate," and "That studio lighting is too bright for some of the mocap cameras" were common phrases but unacceptable for efficient productions.

Since then, processors onboard the camera, intelligent thresholded masking, camera calibration from subject data rather than the wand wave, and more have made both motion-capture technicians and movie crews rest easier.

What else is being done with mocap and film today? The sheer scale and ingenuity of the work performed for three consecutive movies at Sony Pictures Imageworks deserves mention. With several thousand face and full-body markers in a scene, hundreds of motion-capture cameras being operated from a single system, as well as A-list talent and props, the logistics of both the motion-capture shoot and the processing of the data required a great deal of innovation.

ILM took mocap outdoors and into the jungle with a groundbreaking technology it developed in-house. The results helped *Pirates of the Caribbean: Dead Man's Chest* win this year's Visual Effects Oscar, and helped break several box-office records, too.

Several other technologies rising out of the minds and hearts of clever people all over the world will continue to help filmmakers tantalize audiences. Our R&D lab has literally dozens of relevant new technologies, ones that are often customized for individual directors' and technical teams' needs, and many that will become components of our commercial solutions.

By the very nature of the design goal, motion capture will become more transparent on set, easier to use on the back end, and will continue to produce compelling character animation for the final moving image.

Brian Nilles *is the CEO of Vicon Motion Systems, Inc. and a Member of the Board of OMG, plc. OMG is Vicon's parent company, whose group of technology entities produce image-solving solutions for the entertainment, defense, life-science, and engineering markets. Nilles has been CEO of Vicon for eight years. Prior to joining Vicon in 1997, he held sales and engineering management positions for Smiths Industries.*



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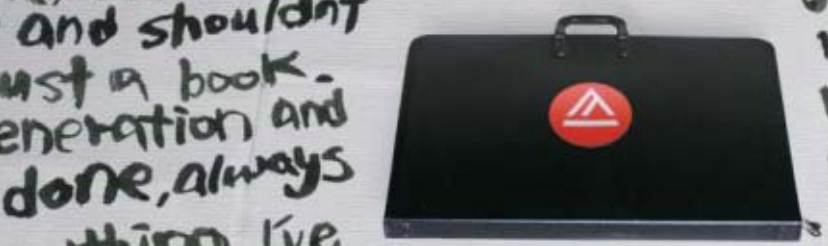
ComputerGraphics WORLD | Congratulations!

Computer Graphics World recently received two Gold Awards in the 29th annual American Society of Business Publication Editors (ASBPE) competition for business-writing excellence.

Chief editor Karen Moltenbrey's "On Holy Ground" won in the Case History category.

Contributing editor Barbara Robertson's "Big Moves" won in the Technical Article category.

my portfolio is me, everything I am and it's everything I'm not. It's my weakness and my strengths. my self-confidence and -esteem. my past, present, and most definitely my future. my portfolio is where I'm going. where I've been, places I shouldn't have been, gone and shouldn't go. It's everything and just a book. It's my inspiration, my generation and It's never finished. never done, always a work in progress It's everything I've ever seen, heard, touched, smelled, sensed and believed, and my worst fears and all my hopes at the same time. It's the beginning of the beginning and the end of an era - and so much more than a phase. It's my portfolio and describing it is describing me.





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Dreaming... and Dancing

The CG characters in all three SIGGRAPH award-winning films spend time in a digital dream By Barbara Robertson



The stylish animated film "En Tus Brazos" ("In Your Arms"), created by students at Supinfocom in Valenciennes, France, received an Award of Excellence at SIGGRAPH.

When Grzegorz Jonkajtys attended the premiere for the Polish film *Quo Vadis?* at Vatican City in August 2001, little did he know, a side trip deep into the catacombs beneath the Appian Way would be the start of a personal journey. At the time, Jonkajtys was working as an animator for Platige Image in Warsaw, which had created 30 visual effects shots for the film. As he walked mile after mile, alongside thousands of burial shelves carved into the soft walls of the dank tunnels, he imagined being inside a large ship.

"I thought of a huge oil tanker, with networks inside of what looks like graves that are platforms for people," Jonkajtys says. From that vision, he developed a script for a short film about an ark carrying the only remaining survivors on Earth of an unknown virus.



A 3D ark floats within a digital matte painting at the beginning of Grzegorz Jonkajtys's award-winning short animation, "Ark."

Six years later, that film, "Ark" ("Arka" in Polish) was nominated for a Golden Palm for Best Short Film at the Cannes Film Festival, received a Prix Ars Electronica Award of Distinction, won Best of Show at SIGGRAPH over 905 submissions, and because of the SIGGRAPH win, is in the running for an Oscar nomination.



Along the way, Jonkajtys, who had created the short film "Mantis" while at Platige, moved to the States in 2003 and joined CafeFX. There, he was a digital artist on *Hellboy*, *Blade: Trinity*, and *Sin City*, and lead animator on *Pan's Labyrinth*. In addition, he helped create with director Tomek Baginski and executive producer Marcin Kobylecki's award-winning film "Fallen Art."

"I did the first tests for 'Ark' in 2003 when I first started working for CafeFX," Jonkajtys says. "No. Wait. I did something even before at Platige. But, I didn't like the outcome in 2003. I was doing something realistic in CG like *Final Fantasy*. However, I needed a motion-capture stage, and it required so much facial animation work, I dropped it for a couple years."

Dropped, but not forgotten. About two and a half years ago, after working on the animation for "Fallen Art," Jonkajtys decided to commit to the project. "Marcin [Kobylecki] would have killed me if I hadn't finished," he says. "He had put a little of his money into it and had started recruiting people."

Since then, Jonkajtys and friends who he and Kobylecki recruited from Platige and from CafeFX worked on the film in their spare time. During that period, Jonkajtys changed the script. In both scripts, the main character discovers that he has the virus. In the first version, the ship filled with the supposed survivors pulls into an island. The island's configuration matches that of the virus as seen under the main character's microscope—a metaphor for the ship infecting the last healthy cell.

"I thought that idea was too much science fiction and maybe too much of a cliché," Jonkajtys says. "I wanted to make it less of a wide drama; to make it more of one person's tragedy." That change allowed him to turn the virus into a metaphor that gives the film an interesting twist at the end: The "virus" is life itself; the main character is in a retirement home.

For character design, Jonkajtys first turned to friends. "I hadn't told them the new ending, so maybe they didn't like the script," he says. "I finally did the character designs on my own." He sketched humans with animal characteristics.

"They're on an ark," Jonkajtys says. "I wanted to stylize them in a strong way. They became less obviously animals later, but they're still twisted a little bit. Some people hate them; some people think they're interesting. At least they look original."

The filmmaker then sent those sketches to modelers, who worked in Softimage's XSI, Luxology's Modo, and NewTek's LightWave, building polygonal models that were subdivided in

rendering. "I can model, he says. "But I wanted to go to people who specialize in modeling." Jonkajtys, however, animated the main character using XSI. Grzegorz Kukus, Lukasz Muszynski, and Tracy Irwin helped by animating the secondary characters. "I was working in XSI because it was the least-expensive good animation software I could buy for $500," he says. "I was able to rig and animate in it."

For the backgrounds, Jonkajtys decided to create miniatures. "I wanted the technique for the film to be original and not 100 percent computer work," he explains. "I already work on the computer 10 hours a day. Plus, using miniatures made it more like a real film-set experience."

Jonkajtys built a test set with pieces from tanks, helicopters, submarines, and so forth that he bought in a model shop. Then, he sent it to Kobylecki in Poland.



"Marcin liked the idea of miniature backgrounds so much that he started building them himself," Jonkajtys says. "He took nine months to build the cabin and corridor, working after-hours. A friend from art college built the interior and the hull." The pipes are drinking straws. A wheel from a miniature tank turned a lunch box lid into the ship's metal door. To maintain a consistent scale, the model-makers used a Spider-Man toy as reference.

When the filmmaker flew back to Poland to renew his visa, he painted the miniatures white. "That way, I was able to see all the details in the shadows," he says. "I knew I could grade it down in compositing."

To film the miniatures, Jonkajtys attached a Nikon D70 digital still camera to the head of the motion-control rig at Platige. "I'd photograph one chunk of the miniature using a typical motion-control move, but I was shooting stills, not film," he says. "Then, I'd put the miniature farther from the camera and photograph the stills again using the same camera motion." By using this stop-motion technique, he ended up with 3K-resolution plates that he could layer together without having to scan film.

"Even though I repeated the same model into the distance, the miniatures are so complex you can't tell," Jonkajtys notes. "Also, I used various spotlights here and there to highlight different areas."

The process taught Jonkajtys more about the film-set experience than he anticipated. "I knew the theory about mixing live-action CG miniatures shot on bluescreen from working at CafeFX for a couple years, but I totally failed when it came to lighting the bluescreen," he says. "There was a blue wall in the motion-capture studio. I lit it so badly that removing the models from the bluescreen was terrible. But, now I know."

Once Jonkajtys had plates with the backgrounds—the white miniatures he had shot—he began animating in XSI. The other animators created performances for the background characters using Autodesk's 3ds Max, and a matte painter worked on painting the backgrounds.

"The first shot of the big ship is 3D," says Jonkajtys. "I gave that to a matte painter who painted on top of it, added moving water and birds, and the sky," he adds. Similarly, the painter worked in Adobe Photoshop to color the ship interiors.

"We projected the still photographs we took and painted on top, and then in 3D, the camera would fake the movement to get the parallax," says Jonkajtys. 'It's funny, because you can't tell which is camera motion shot on set and which is motion from the 3D camera in XSI."



Jonkajtys designed the main character in "Ark" to have animalistic features. He used Softimage XSI to create a performance for the 3D character, and received help from friends at Platige Image in Warsaw, Poland, and CafeFX in Santa Maria, California, to make the film.

To import the animation, Jonkajtys used Point Oven for XSI, a commercial plug-in from Mark Wilson, senior TD at Framestore CFC. "I've been using it since Version 1," he says, "and I knew it was getting better and better." He also used Point Oven to transfer the animated scenes with cameras into LightWave so that he could use Worley Laboratories' FPrime renderer.

"I was rendering most of the film on my laptop," Jonkajtys says, "and FPrime is so blazing fast, it's unbelievable. I used

displacement, and subsurface scattering on my main character, and I could render 2K sequences in two to four minutes per frame." The laptop was a Dell with dual-core Intel chips and 2G of RAM. He output beauty passes and sometimes light passes, rendering the whole film in high definition.

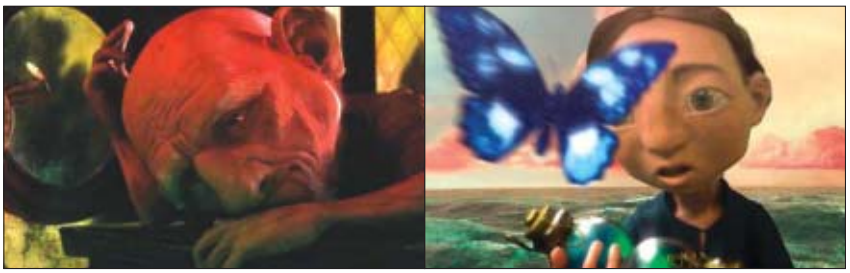
"Every surface has detailed textures and shaders," says Computer Animation Festival chair Paul Debevec. "There's a shaft of light streaming through a tiny porthole, and we could see droplets of dust floating in it. The camera doesn't focus on it; it's just there. He made good use of translucency in the materials and good use of indirect illumination. It adds up to a compelling experience. He created a whole world, unlike any other we've seen."

For compositing, Jonkajtys used Eyeon's Digital Fusion to marry the backgrounds and the animation. "I wanted to make everything 16 bit, but I couldn't handle that on my laptop," he adds. "So everything is linear 8 bit."

It turned out that the laptop had an unexpected advantage, though. "I was scared about how it would turn out on film; I was afraid of clamping—that I'd have flat darks," Jonkajtys says. "But, on film, it looked softer and richer. It's probably not a good thing to check colors on an LCD screen, but it showed me where the clamping would occur, and I could avoid it."

The final shot in the five-minute film is Jonkajtys's favorite. Other than the first shot, which is a 3D matte painting, it's the only all-CG shot in the short. Because it's an outdoor scene, he couldn't use the miniatures. "I would have had to use hundreds of light bulbs to make the light look like it was outdoors, and I couldn't afford that," he says. "But this is the part I'm most proud of in terms of animation. I did the first scenes three years ago, but I couldn't go back and re-animate them."

Jonkajtys estimates that even with Platige providing the motion control, the film still cost $25,000 to make. We financed it from our own pockets," says Jonkajtys. "Our friends really did like to help us, but it took so much time, we paid a couple guys a monthly rate. I was saving, saving, saving, and then everything went into this. But I think it's worth it."



Award-winning filmmaker Leszek Plichta modeled, animated, rendered, and composited the 14-minute animation "Dreammaker" while a student at the Filmakademie in Baden-Württemberg, Germany.

In fact, he believes it has already made a difference. "The film has been shown in places like Cannes and SIGGRAPH, and I'm able to meet a lot of people who I would never have dreamed of." And, it's only the beginning. "Ark" enters the Oscar race this fall, and Platige is busy entering the film in festivals all over the world.

"Mantis," the first film Jonkajtys created in 2001, gave the art-college graduate the ticket out of graphic design and motion graphics, and passage into animation and visual effects. Now, his "Ark" will send him into a world of new possibilities as he follows his goal of someday directing his own feature film.

Dreaming

In addition to the Best of Show, SIGGRAPH's Computer Animation Festival jury singled out two student films that also received recognition. "Dreammaker," from Leszek Plichta, who created the film while studying at the Institute of Animation, Visual Effects, and Digital Post Production at the Filmakademie in Baden-Württemberg, Germany, took Jury Honors. "En tus Brazos," from students François-Xavier Goby, Edouard Jouret, and Matthieu Landour at Supinfocom in Valenciennes, France, received an Award of Excellence.

Plichta animated his 14-minute film "Dreammaker" entirely on his own, working in Autodesk's 3ds Max. It took nearly four years. "Fourteen minutes, 21,000 frames, 200 shots, one to three days per shot, sometimes a week," he recounts, "and that time doubled when I had both characters on screen. I animated it chronologically because I was the only animator. I learned along the way."

Inspired by the words "…dream maker, you heart breaker, wherever you're going I'm going your way," from Henry Mancini's song "Moon River," Plichta first imagined a story of an old wizard who made people happy with magic greetings. "That was too boring," he says, "so I made him an old, frustrated misanthrope. People came to him for dreams and signs, and he learned to manipulate them. But, his house became his prison. His world is a dream. So, he tries to manipulate himself." And then….

To develop this fairy tale for adults, Plichta collaborated with a friend, Dominik Steffan. "I wanted to do a real-person story," he notes. "I didn't want to create slapstick animation. I wanted something more serious and adult-like."

The filmmaker designed the Dreammaker's house like a ship with bars on the windows, and built characters with big hands and limbs. "I started modeling in 3D," he says, "but the characters were unsatisfactory. "Then, one of the students created a maquette, and I did one myself." He used his maquettes as reference to build new 3D models.

Simulation—smoke and water—was most difficult. For water, Plichta used Next Limit's RealFlow; for smoke, Aura from the Chaos Group. He painted skies in Adobe's Photoshop and composited in Eyeon's Digital Fusion.





The film-noir style of lighting effects, depth of field, and precise touches of color combine to focus the viewer on the tango dancers in "En Tus Brazos." The short film, set in the 1930s, was created by a trio of students.

"'Dreammaker' has great computer graphics," Debevec says. "When the old fellow is creating dreams, we see bubbles inside potion, fluid effects, vapor effects. It's a very nicely done film, and by a student." Even without using shadows or reflectance passes, many of the shots had 25 layers. "This is the longest and biggest film I've finished," Plichta says. "But even simulation, which was hard to do, was fun."

Dancing

"En Tus Brazos" ("In Your Arms") opens with two dancers coming into focus, followed by the words "amazing!" and "fabulous" in lights on a marquee next to a poster of the tango dancers. Next we see the man's face. He looks at pictures from his career; each photo comes alive. A hand slaps across one of the photos, and a woman's voice says, "Stop Jorge." When the camera pulls back, we see that the man is in a wheelchair.

His wife closes the book on his lap and walks to the window. She has an idea. She puts a record on the phonograph, and when the music starts, she pulls her partner up out of the chair. She moves his legs with hers, and they dance into a dream.

The four-and-a-half-minute film, which is set in the 1930s, is shaded like a faded photograph, and each element in the film—the style of the tango shoes, the woman's dress and hair, the wheelchair, even the mandolin—came from the time period. Soft colors deftly move the eye to a bow in the dancer's hair, to the chair, to a rose. The filmmakers focused the viewer's eye using depth of field and a film-noir style of lighting. Lighting effects also created an illusion: Rather than modeling, animating, and rendering cars for a dream sequence, the team simulated the nighttime traffic using streaking light.

SIGGRAPH doesn't always give an Award of Excellence, although the rules state that, at most, the committee can recognize three films. This year, it did. "This film stood out because it's a compelling story, very compact and efficient," says Debevec. "The characters have really interesting designs that work well for the tango dancers. The stylized animation was a great way to communicate on screen something more compelling than you could by filming someone doing the tango. They explore the relationship between the husband and wife team of once-great dancers. You can tell that they're fiery folks who probably had a wide spectrum in their relationship. It is a successful piece of filmmaking."

François-Xavier Goby came up with the idea while in South America. "I wanted to make a film about someone who had lost the use of his legs and couldn't dance anymore," he says.

To create this film, because it was their first animated project, Goby and fellow students Edouard Jouret and Matthieu Landour shared the production, each modeling, animating, shading, lighting, and composing some of the film. They worked in Autodesk's 3ds Max, using Adobe's Photoshop for painting and Adobe's After Effects for compositing. Eventually, they danced toward specialties. "Edouard enjoyed animation the most," says Goby. "For me, the best parts were directing and animation, and for Matthieu, directing, editing…and the coffee."

If we look for similarities among the three winning films, two come into view: Filmmakers from countries other than the US created all three films (with an assist from California-based CafeFX), and all three films centered on characters who spent some time in dream worlds. But, the dissimilarities are more fascinating. Even though they used similar tools, the filmmakers created, animated, and rendered each film in completely different, equally successful styles. Clearly, these days, CG animation is about the artists, not the tools. ❖

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New-Age Entertainment

Filmmakers—no matter if they are from small, independent studios or from the largest facilities, or somewhere in between—are discovering the advantages of using digital sets. Creating CG backgrounds are saving untold dollars in production costs, since filmmakers, crew, and talent no longer have to travel to exotic locales to have such imagery in the background of their production. Nor do they have to rent endless hours of time on an expensive sound stage. Instead, rich, imaginative 3D imagery is accomplishing the same goals or, in many instances, surpassing them.

The implementation of CG sets is hardly new. However, recent uses—in particular, for the film *300,* which employs a unique graphics style thanks to the all-CG backgrounds—has placed the technology in the spotlight.

In May, a small independent studio, Stage 3 Media in Vancouver, British Columbia, debuted a unique Webisodic series, called *Sanctuary,* which was filmed in HD using greenscreens and CG backgrounds (see "Creating Sanctuary," pg. 22). In another fairly recent application, a small, indie facility fashioned digital sets to create something new by using something old. Open Sky Entertainment created a remix of the 1919 horror film *The Cabinet of Dr. Caligari,* whereby modern actors were filmed against greenscreen and inserted in front of digital versions of the original movie sets (see "Something Old, Something New," pg. 27).

While each production places a new spin on the use of CG sets, the end result is the same. The technology provided the only means for the small, creative groups to achieve their artistic vision.

—Karen Moltenbrey



Creating Sanctuary



By Karen Moltenbrey

A new science-fiction drama recently made its worldwide screen debut. The episodic series is called *Sanctuary*, and it is fast becoming a hit. The program touts a number of well-known stars, including Amanda Tapping (*Stargate: SG-1*, *Stargate Atlantis*) and Robin Dunne (*Dawson's Creek*, *Species 3*), and features an abundance of advanced visual effects. But don't look for it on cable television; it can be seen only on the Internet. Unique for a drama, *Sanctuary* also offers a number of innovative interactive elements. Moreover, an entire season was filmed in a mere 20 days. And the overall production costs have been a fraction of those for a comparable television series of the same depth and breadth.

Sanctuary, which takes viewers into a thrilling world where science meets the supernatural, was filmed using greenscreen, with lavish, detailed CG sets serving as the backdrops to the action and drama.

Shooting live-action footage against greenscreen is a growing trend, particularly in light of some recent successes—in particular, *Sin City* and *300*, the movie adaptations of Frank Miller's graphic novels (see "The Art of War," March 2007, pg. 21). "I feel like we're riding the crest of an amazing wave," says Tapping, who also serves as an executive producer for *Sanctuary*.

The reasons for this trend are simple: Using 3D sets costs less than filming on expensive sound stages and allows small, independent companies to make their own mark in the entertainment world. Digital sets also allow for more creative freedom, as there are virtually no limitations placed on the camera in the virtual space or on the artist when crafting the sets. Furthermore, the technology enables the director to try new things, and by bringing the series to the Internet (as in this case), the property can be augmented with interactive elements and more.

For a series like *Sanctuary*, these advantages are invaluable. According to visual effects producer Ron Martin, without the use of virtual environments, it would have been nearly impossible for an independent production company like Stage 3 Media to produce such a compelling show, let alone do so in HD. In addition, *Sanctuary* features unworldly creatures and imaginative locales that are far easier to create using computer graphics.

The show follows the exploits of Dr. Helen Magnus (Tapping) as she seeks out all types of terrifying and monstrous creatures. She is aided in her quest by her reluc-



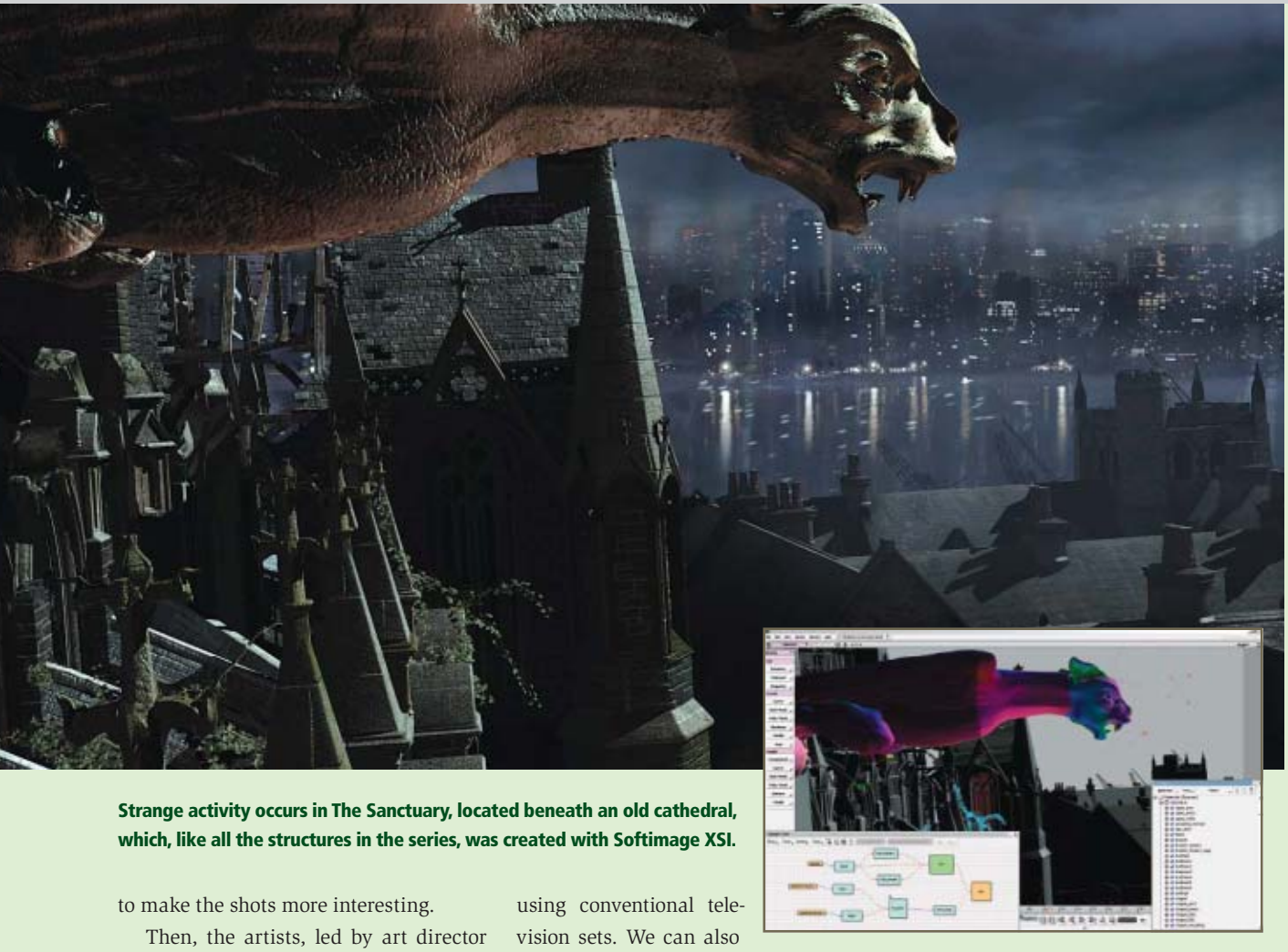
Taking advantage of many new digital trends and technologies, the creators of the Internet series *Sanctuary* were able to deliver a compelling episodic story, along with rich, HD imagery at a reasonable cost for an indie facility.

tant protégé, Will Zimmerman (Dunne). The world they inhabit is mysterious and populated by beings that defy explanation. "We've heard people say that *Sanctuary* is sort of like *Buffy the Vampire Slayer* meets *X-Files*," says Martin. "We get goose bumps because those are two pedigree products we are being compared to, and it heightens our enthusiasm just knowing we are venturing into the same genre."

While *Sanctuary* is only about a year old in production terms, the script is approximately nine years old, generated by the show's writer/creator and executive producer, Damian Kindler (*Stargate*). A few years back, Kindler entered a casual conversation with his friend, Electronic Arts VP and executive producer Marc Aubanel concerning the difficulty and expense of producing media, particularly at large conglomerates. When idle talk turned into more serious consideration, they approached Martin, who was working as director of cinematics at EA, and he offered his insight into using a digital approach to storytelling. Soon thereafter, the group approached director Martin Wood, who contributed his expertise in television production. "We realized that creating a quality product would require utilizing every one of our faculties and our connections," says Martin.

The Virtual World

Founded in 2006, Stage 3 Media began production on *Sanctuary* with an extensive previsualization process. Using Autodesk's MotionBuilder, a group of artists blocked scenes with virtual characters and a virtual camera. "Because we shot greenscreen, all our sets were modeled in CG, so we could import those dimensions and sets right into our previz. In previz, we could manipulate the position of our sets easily for a more efficient production," explains Martin. By using digital actors, or digital dummies, the artists blocked out the shots, giving them a clear picture of what had to be modeled in 3D and where details had to be added



Strange activity occurs in The Sanctuary, located beneath an old cathedral, which, like all the structures in the series, was created with Softimage XSI.

to make the shots more interesting.

Then, the artists, led by art director Todd Van Hulzen (scenic designer for *Girl With the Pearl Earring*), began building the virtual sets that would transport viewers into the strange, Gothic-style world of *Sanctuary*, which is populated by things that are both seen and unseen. "The shooting method that helps convey our visual style is 'a thousand eyes'—that, at any point, you can be watched by a creature of sorts or by those from a much higher level of society," Martin says. "That affects how we use our camera. In our visual style, we break the boundaries of conventional TV."

Because the group is using virtual sets, it is not confined by what would normally be a TV stage, or set, with three walls and no ceilings. "In that conventional shooting methodology, you would be pointing the camera at characters and would cut between the characters," explains Martin. "We can shoot very low shots or crane up very high and extend not only our sets into the x and z axes, but also on the y axis, so we can create a much more dramatic camera move than we could by using conventional television sets. We can also shoot 360 degrees, and have been doing that with our cuts, working around a set to show all 360 degrees of it."

With digital sets, the art team was virtually unlimited in its ability to explore concepts and designs that were representations and extensions of the characters, thereby furthering the *Sanctuary* story line. For instance, the time period of *Sanctuary* is in the near alternate future, and the story takes place in two very different locations: Old Town, a dark, ominous, rundown, nearly deserted area, and New Town, a big, bright, modern section across the river. Linking the two locales is an elevated train whose ride through Old Town is as risky as a middle-of-the-night walk through the dark alleys in the same part of town.

"When designing this world, we took an approach that there are two different levels of beings. There are people who live in New Town who embrace technology and use it to fulfill their lust for power. Old Town is a dilapidated, more conventional part of the city along the river that was abandoned for New Town because of some incident," explains Martin, careful to not give away a story spoiler. "It is as contrasting as the Emerald City is to the land of the Munchkins." This gap extends to the differences between the people who live in New Town and those who inhabit Old Town.

Situated in Old Town is The Sanctuary, located six stories underneath a burned-out Gothic cathedral. It is here where the seemingly ageless 157-year-old Dr. Magnus has established her secret lab; inside shows a contrast of old and new, with high-tech gear situated beside 1880s bottles and devices. The people of Old Town are aware that something suspicious is occurring at the lab under what was once a picture of the city's architectural height and grace, but exactly what that is escapes them.

The Sanctuary, like all the other locations in the series—whether an indoor or outdoor setting, from the bowels of the cathedral to the heights of the 50-foot skyscrapers—are completely computer-

generated, created in Softimage's XSI. By creating the sets in 3D rather than using 2D matte paintings, the artists are able to reuse them in every which way possible—for example, for successive storytelling in future episodes. Additionally, 3D provides the freedom of camera in which to show a rich environment by panning and tilting for multiple perspectives.

Likewise setting the scene are a range of CG effects, such as fog, atmospheric elements, fluid dynamics, particle and hair simulations, and more, also created within XSI. In fact, XSI is the modeling, animation, texturing, and rendering tool at the center of the series' production. Unlike a typical studio production pipeline, Stage 3 Media is designed around a multi-faceted group of artists who perform a multitude of different functions. "That is one of the reasons why we have been so successful," Martin explains.

In addition, the artists use Pixologic's ZBrush for painting, Autodesk's Combustion for rotoscoping and compositing, and Mental Images' Mental Ray for rendering. Nvidia's Quadro FX 5600 cards facilitated the modeling and rendering of the content. As Martin points out, the team maintains its core competencies throughout the production. "When we add more tools, it tends to dilute the ability for people to jump from scene to scene," he says. "I would rather be much more clever with the tools we have than to throw technology at a problem and try to train a talent to wrangle with the technology. Instead, we keep a focused approach to what we are developing, and that ultimately keeps our production costs lower. We don't need more tools; we need the tools to get better."

To augment that key software, the group created its own asset management system, coined DAMS, that is a client/server-based tool for previewing 2D renders, 3D objects, and artwork created using Python, HTML, and PHP. It can be accessed remotely from any locale.

The Real World

Filming for the series takes place at the Bridge Studio soundstage in Vancouver, British Columbia, not far from Stage 3 Media. The group employed a Panasonic HDX-900 720p-1080i HD camera with a custom lens mount for prime lenses that provided a more cinematic appeal to the image quality. "We needed a little more than the 4:2:0 color space," notes Martin. The footage was shot directly to hard disc using a Focus Enhancements FireStore portable FireWire drive. As a result of digitizing the imagery on set and offloading the material directly onto an editing timeline, the group managed to stay within a day and a half of the shooting schedule with the edit.

Filming of the entire first season (which comprises eight 15-minute episodes, or two hours of content) occurred over 20 days. As a result, technology and production costs were minimal. Editing and color correction was accomplished on dual-quad 3.0GHz Mac Pros (with Quadro FX 5600 cards) and running Apple's Final Cut Pro.

In the near future, the team plans to place actors and vehicles in front of greenscreen atop a turntable, which will rotate as the crew tracks the camera. "We are expanding our concept of a digital set," Martin says. For now, though, the group uses a 3D Inserter, developed by Mosys, which enables the group to take the live feed from the camera and do a live composite on set to see where the actors are situated in relation to the actual physical set. As a result, they can make adjustments accordingly on set.

Unlike the sets themselves, most of the props that are handled by the actors are practical, though from time to time prop extensions and prop effects are added in CG. While most of the actors are real, some are not. Seeking shelter in the sanctuary are a number of monsters, or abnormals. Sometimes these are live characters with prosthetics or CG appendages; other times they are all-CG.

Web Advantages

Stage 3 Media's use of digital technology is not limited to the sets and characters. Rather, the company is employing a Web-based delivery model to "air" the episodes. Every two weeks starting this past May, a new, roughly 15-minute segment was made available for $2 each at *www.santuaryforall.com;* previous episodes are also available. The firm hopes to begin a next "season" this fall, following a brief hiatus.

Stage 3 Media currently has teamed with VitalStream, a content distribution



Above left shows one of the actors alongside a vehicle, filmed against greenscreen. Above right is the final shot, with the actor and car composited onto an all-CG background. With the exception of the actors and some props, all the imagery in the series is CG.



By creating the sets in 3D rather than 2D, the producers are able to reuse the imagery in subsequent episodes.

network with servers worldwide, to efficiently deliver *Sanctuary* from the nearest node to the user. Revenue is acquired solely through subscription, so users will not experience annoying pop-ups or other distracting advertisements. Presently, Stage 3 Media is developing its own platform to distribute and play its own media, a Flash-type technology. Meanwhile, the company is looking into linear distribution methods as well.

And, Stage 3 Media is not stopping its technical development at the point of being able to deliver the show. "We have tracked the camera data off the set on every single shot that we are going to use as part of our player. This will be a 3D engine that will allow viewers to pause the show and walk onto the digital set and move around within the set," Martin says. Indeed, the viewer would be locked to the camera plane while watching the show and would not be able to run the video while being situated within the set. Nevertheless, this capability would provide a novel, enhanced experience.

In addition, the company is building a social networking engine, and will be hosting contests and games within the 3D space on the site, all of which will be available in the near future. "We started the process with the show, but we are not stopping there," Martin promises. "The goal is to make an enriched media experience with the content from *Sanctuary* and its story line. Then, while writing and finishing the script, we have the potential for other methods of involvement, for example, through interactivity with three-dimensional objects or sets, or by meeting someone in the world of *Sanctuary* similar to what occurs in *Second Life*."

From a production standpoint, the company is focused on advancing the interactive producer ideals of the show by creating a multi-format user experience. As a result, the group will focus on a user-driven model whereby the producers will listen to the fans and react accordingly. "That feedback is instantaneous on the Web, which is ideal for this type of a project because after we write and develop scripts, we can hear what people like and don't like, and anticipate the viewers' desires and then pleasantly surprise them by using the information they provide in ways that they never would have guessed," says Martin.

New Beginnings

Using these atypical methodologies, Stage 3 Media was able to do the unthinkable: produce its own episodic series. Though Martin could not provide final figures, he notes that the pilot—an engaging 23-minute peek at the intriguing world of *Sanctuary*—cost close to $3 million. In contrast, the production fees alone (sans post-production and to-air costs) to do the same work for television would have been more than $10 million. That ratio holds throughout the rest of production, he says.

"We can do this because we are our own full-service production facility. We shot, produced, wrote, designed, built the VFX, and distributed the content in an HD format," says Martin. "It would have been impossible to do any other way given our budget and time frame."

Yet, employing a digital delivery model poses a risk. Are there enough viewers who, at this time, are ready and willing to try something different? Martin believes so, pointing to how digital downloads have revolutionized the music industry. Moreover, he believes that the sci-fi nature of the show will draw more technically oriented viewers. "Our target audience comprises those who use computers and appreciate an action story that can suspend their belief system within an alternate universe," he says.

Adds Kindler: "This is the next evolution of series-based entertainment. *Sanctuary* is the first series developed exclusively for an online audience that offers both standard- and high-definition resolutions, plus direct communication between the fans and the *Sanctuary* creative team."

And there is no better time for an independent filmmaker to enter the entertainment space, particularly with directors like David Fincher and Robert Rodriquez—both whom Martin lauds—leading the charge. So, it's hardly surprising that Stage 3 Media is planning other productions. "We have proven that for a small amount of money, we can produce a broadcast-quality production in HD that we believe rivals the quality of production on TV right now," Martin says, stopping short of a reveal.

Just as audiences are no longer limited in their entertainment selections by the large television networks, so, too, are those tuning in to the Web, where a number a small, independent studios like Stage 3 Media are offering "sanctuary" from cookie-cutter productions. ❖

Karen Moltenbrey *is the chief editor for* Computer Graphics World.

Something Old, Something New



A small facility remakes an old film classic by using original backgrounds. Above is a completed shot; below shows the actors and props, shot against greenscreen.

Remixing an old silent film: Using today's actors on yesteryear's sets

By Karen Moltenbrey







To acquire the backdrops, the group digitally scanned a good-quality print of the original movie and then tried to select frames that didn't have any actors in them. During a two-week period, the present-day filming was done, with the contemporary actors. Then, during several months of postproduction work, the actors were digitally inserted into the scenes.

Many movie enthusiasts love the look of the old silent movies—the subtitles, the grainy and jumpy black-and-white film, the locked-down camera, and the over-dramatization. These features account for the charm, they say; to others, they make the film difficult to watch. Recently an effects artist decided to eliminate those obstacles in the classic 1919 horror film *The Cabinet of Dr. Caligari* by remixing the movie, using the original sets as digital backgrounds. As a result, the project set a milestone, marking the first time that original sets from a silent-era film were used as backdrops that integrated present-day actors.

The director contemporized the original story and film by adding new dialog and using a new technique in on-set compositing whereby the actors were shot completely on greenscreen and composited into the originals sets of the original film.

The project is the brainchild of David Fisher, a VFX artist and former game cinematics creator, who directed the remix for Highlander Films. Christopher Duddy, cofounder and executive producer at the film production company Open Sky Entertainment, served as cinematographer. The remix was released on DVD this past summer by Image Entertainment.

"As evidenced by the extraordinary success of the film *300* (see "The Art of War," March 2007, pg. 20), the blending of live action against CG backgrounds is certain to become a bigger and bigger part of the future of cinema," says Duddy. "The major difference between our film and a film like *300* is the time and budget. We shot our movie in nine days for less than $150,000."

Making the Cut

So, what made *Dr. Caligari* an ideal candidate for this exercise? "The original movie is one of my favorites," says Fisher. He loves the aesthetic of German Expressionism—in particular, the crazy, tilted, skewed worlds of *Dr. Caligari*. On a story level, it has a classic detective-esque story line running on the top, along with a lot of metaphor and psychological horror at the sub-story level. Moreover, Fisher also likes the modern versions of works such as Tim Burton's *Edward Scissorhands* and *The Nightmare Before Christmas*. "It's a style I like," he says simply.

One day, while watching *Dr. Caligari*, the idea came to him. "I thought, this is such a great movie, but it is not accessible to modern audiences," says Fisher. "The hard-core fans hate to hear that, but it is a slow-plotting, older movie, and it is silent. Then I began to think how nice it would be if the movie were updated without usurping the original, but rather, exemplifying how great it is."

Yet, Fisher also realized that redoing this film again independently would be out of the question due to cost and manpower. "It would have been impossible to build all those incredible sets again," he adds.

Undeterred, Fisher came up with a solution. In the 1990s, he had created cut-scenes for a game called *Metal Works* that used greenscreens. It was a garage-type 40-minute movie that won first place at the San Francisco SIGGRAPH competition. Because *Dr. Caligari* is public domain, he reasoned that if he was able to locate a good print, he could pull the backgrounds while shooting actors on greenscreen, and then composite them into the original film. In this way, an epic version of the movie could be created, as opposed to a modern update.

Test shots and composites proved this could be done. Fisher then used those tests to persuade Leonard McLeod and Paula Elins to join the venture as producers. Next, Fisher wrote a script based on the original story outline he located on the Internet, augmenting it with new dialog and a richer exploration of theme and character.

Production

The group cast the new actors within two weeks, while Fisher did the preproduction work. This involved printing the original film frames onto paper and making notations. Yet, there was no camera data from the original production. "I took all the stills I collected for each scene and built a system whereby I would run a tap out of the camera and do a quick and dirty composite, so we could see where people were standing in the set—previz, basically," says Fisher.

Filming lasted nine days on a stage in Burbank, California, and involved the use of two Panasonic AG-DVX100A cameras that didn't move more than four feet during the entire movie. "Once I had the shot lined up, I incrementally placed people in the background," explains Fisher. The group averaged 54 setups a day, all of which were greenscreen shots with the exception of a handful of 2D sets. "A few of the interior sets were flats that we kept repainting and repurposing," he adds. These included one for the inspector's office and another for the interior of the caravan. Stairs were green, and anything anyone touched was a prop.

The biggest job of all occurred in post, where Fisher and VFX supervisor Josiah Holmes Howison spent 10 months digitally inserting the actors into the background imagery. First, the duo made a scanned print of the original, working in on uncompressed format. "We got an excellent original print that was spirited out of Nazi Germany in the 1940s. Nevertheless, it was like we had gotten it out of the ocean," describes Fisher. "It had a strange frame rate, like 25 fps; basically it was hand-cranked, and the shutter had half-frames. I went through and found the best frames I could, and we cleaned those up." Sometimes there was a clean frame available without any characters, and other times the two men had to stitch pieces of frames together. When neither option was available, Fisher and Howison used Adobe's Photoshop to paint out an arm or leg, for example.



The team cleaned every frame in the original footage to ensure that the new imagery blended seamlessly with the old.

The task became more complicated in the new scenes as the actors moved through walls and doors. "We never built green partitions, so we did a lot of masking," says Fisher.

All the compositing work and motion masks were done using Adobe's After Effects. Fisher and Howison also used some new tools that were just coming out at the time, including dvGarage's DV Matte Pro, a keyer with light-wrapping tools: "My secret weapon," says Fisher. "The program was so good that we couldn't have done the movie without it."

In addition, the compositors used what Fisher's assistant calls "the secret sauce," the ideal combination of settings from eight plug-ins. "The original film has about 10 percent color, though it looks black and white. And we needed a way to comp people into those backgrounds so they didn't look pasted on," Fisher continues. "We used off-the-shelf plug-ins that we messed around with for a long time until we finally got the right look to seamlessly punch people into the backgrounds." On the downside, this resulted in high rendering times.

"The entire movie is basically a 76-minute effects shot," says Fisher. The film was shot at 724/80 resolution and rendered on eight homegrown Pentium 4 PCs. "Every single frame from the original was cleaned up," says Fisher. "If you look at the number of passes we did, we probably rendered the whole movie at least eight times over. We would come up with innovations and then go back and redo shots."

Because of the greenscreen, very little roto work was required. Similarly, there was no tracking needed because the style of the original was locked-down. "If we would have had to track people, there would have been a whole new technical level to address," says Fisher. While filming the new footage, the group retained the stillness of the movie, though they did add a few camera moves in post to the updated version.

The overall goal was not to replicate the original shot for shot, but rather give it a modern edge while keeping the film in the era. "Some might think the acting is a little choppy, a new film with characters acting old. Some think it's genius, and others do not understand it, and that's OK," says Fisher.

Spark of Innovation

"Just a few years ago, who would have thought it was possible for two guys in a room to digitally make a feature film by placing new people in a very old place using off-the-shelf tools?" asks Fisher.

The director first became interested in digital backgrounds when he saw *Tron*. "I didn't know what it was, but I knew I wanted to do it." Fisher's dad said it was not possible without millions of dollars' worth of computer equipment; and back then that may have been the case. But a few decades later, Fisher proved him wrong.

"There are some purists in the world who say, 'How dare you touch something that's sacred?' But I think the majority of people will think it is very cool and doesn't detract from the old version, and it actually piques their interest in the original and shines light on the classics by making them more accessible," says Fisher.

This fall Fisher will apply many of the same techniques he used for the remix of *Dr. Caligari* in his newest project: a Vincent Price-style horror feature based on Edgar Allan Poe, with an indie movie twist. He will be using newly created backdrops in that latest greenscreen project—a process that is adding new color to feature films. ❖

Karen Moltenbrey is the chief editor of Computer Graphics World.

tangible designs



Engineering files hit a high note as they move beyond the factory floor

By Kenneth Wong

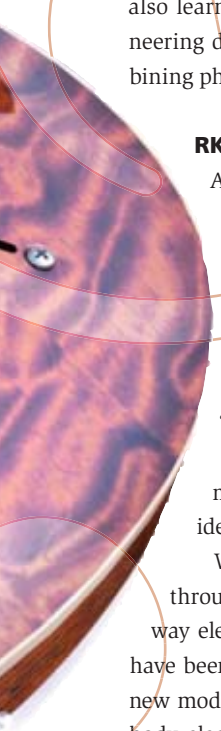
CAD information is no longer limited to just engineering. Rather, the data is being used for a multitude of purposes. Here, RKS Guitars used Autodesk AliasStudio software to generate photorealistic renderings of its signature instruments for client reviews and brochures.

Suppose you're a guitar maker and your latest client is an uncompromising lefty. To convince him that your special left-handed edition suits him ergonomically, you can let him strum his favorite Beatles hit on a readily available model in the showroom. The musician needs to feel the sturdy fretboard and hug the solid body against his chest before he is sold. It's impossible to mimic those tactile sensations digitally.

But what if the person wants to see how the same model would look in a different gloss, perhaps sunburst red or a Malibu blue? What if he wants a cutaway at the bottom so he can reach far down the E string to hit the high notes? Fortunately, those alternatives can be digitally explored in a computer-aided design program, negating the need to deform the display model in order to make the sale.

Similarly, an airline-cabin component supplier might exhibit a fully assembled first-class seat, complete with upholstery, but rely on digital models to show the client various material options and shape possibilities. And a boutique design firm might pitch the idea to a brand owner, combining animation clips, rendered 3D graphics, and a functional physical prototype to present its proposal.

In this article, we make virtual visits to RKS Guitars, cofounded by former Fleetwood Mac member Dave Mason, and B/E Aerospace, whose installed base of products on aircraft currently in operation is valued at $5 billion. We also look at Concepts 2 Reality, which helped shape a rugged remote-control device for Hydro Electronic Devices, and SurfaceInk, which designed an add-on for the Tapwave Zodiac game controller. We also learn how these companies have been reusing their engineering data in other business frontiers, and how they're combining physical prototypes and digital content to win business.



RKS Guitars

At RKS Guitars, the models are organic, and the crux of the work involves variations on a theme. "On a product like [an RKS guitar], there are no flat surfaces. As a result, there are many design challenges, and the advanced modeling capabilities of Autodesk's AliasStudio play a major role in solving them," says Ravi Sawhney, CEO and president of RKS Guitars. "AliasStudio—a tool that allows us to create, manipulate, experiment, and visualize design—allows us to more rapidly experiment and get through the process of identifying which designs are the appropriate designs."

What distinguishes the RKS models is their neck-through-body construction, a departure from the traditional way electric guitars are built. According to RKS, while there have been both hollow and solid-body designs in the past, the new models from RKS Guitars are the first open-ended, hollow-body electric guitars and basses. In the announcement of the new line of guitars and basses, RKS declares, "These instruments combine the best attributes from both designs…they possess the sex appeal and durability of a solid-body design and the sound, resonance, and subtle qualities of a hollow-body design."

The RKS design methodology has a name as captivating as the products it creates. Invented by Sawhney, the process is known as Psycho-Aesthetics, a fusion of science, experience, and design. It usually begins with a design team testing and rating a multitude of products (guitars, in this case) for their sensory, mental, and emotional appeal. Guided by these findings, the designers initiate literally hundreds, if not thousands, of design options.

"It's all about speed, from renderings to physical object," says Sawhney. "Autodesk AliasStudio lets us do 30 iterations, whereas other products may do three, allowing us to refine and perfect in much less time. There is a direct link between the number of iterations and the success of the product." Based on feedback from the clients, consumers, and designers, the three-dimensional digital prototypes are transformed into physical models in the RKS prototyping facility, outfitted with two computer numeric controlled (CNC) machines and SurfWare's SurfCAM software for interpreting computer-aided design data. In addition to AliasStudio, RKS also uses Autodesk's Maya, CoCreate's OneSpace Designer, SolidWorks Corp.'s SolidWorks, and PTC's Pro/Engineer (Pro/E) for digital design work.

B/E Aerospace

Glenn Johnson has clients who like to sit on ideas—literally. Many of them won't sign a purchase order unless they are physically comfortable with what the sales folks are proposing.

Johnson, the director of the B/E Aerospace Design Studio, is in the business of designing cabin components for commercial passenger aircrafts and business jets. A first-class seat and its environment, for example, can cost up to a quarter-million dollars, he reveals. People making that kind of investment usually want much more than a few sketches and a digital model on a laptop. Before they sign on the dotted line, they often want to sink into one of the cushions or swing open the door of a storage cabinet, for instance. To accommodate them, B/E typically presents them with a life-size mock-up, essentially a full-scale cabin section with several passenger spaces.

When pitching ideas, Johnson adheres to the rule of three, which he attributes to Raymond Loewy, an American design legend. "Always give the client three options," Johnson says. "Generally, they'll reject one immediately. Then they'll start debating about the remaining two. That's when you know you've made a sale. They argue about your options only when they care."

With each prototype cabin costing thousands of dollars, Johnson isn't about to build three physical mock-ups for the clients to choose from. He relies on the instantaneousness of

digital content to show his clients the available options—especially those he is anticipating they'll either reject outright or ask him to modify.

"We have developed internally a way to keep parts of the model defined parametrically in the UGS NX environment, and the surfaces in Rhino," explains Johnson. "We use Cintiq tablet PCs [from Wacom] to sketch and draw, and use special photocopiers to scan 11x17-inch drawings, so no matter where an idea starts [on paper or on computer], everything can be digitized."

Johnson continues: "Once we have a sit-down concept for sure, with a rough sketch of what is required [for the seat], it's usually the industrial designers who sketch up the requirements. We digitize this and work with it using tablet systems and 2D software, such as Photoshop, Paint Shop Pro, Illustrator, and so forth. This then comes alive in both Rhinoceros [a NURBS modeling software from McNeel North America] and NX Shape Studio [an industrial-design CAD program from UGS]. We render stuff out in VRay or, more increasingly, with the Lightworks renderer in NX Shape Studio. We also produce visuals with other virtual-reality type software and proprietary video software. These visuals and animations can be viewed in a variety of formats, including handheld devices and iPods."

To test the inertial loads of its seats for FAA certification, the company relies on MSC.Nastran and MSC.Patran, finite-element analysis software products from MSC Software.

Concepts 2 Reality

Whereas B/E Aerospace's clients like to sit on the prototypes, Bruce Nemec, co-founder and design engineer of Concepts 2 Reality, recently discovered his clients like to smash ideas to pieces. During a meeting to demonstrate a remote-control device and its charging station, the client, an executive from Hydro Electronic Devices (HED), decided to see for himself if the design would withstand the harsh conditions the product was meant for. So he picked up the model and, with little or no warning, threw it against the wall.

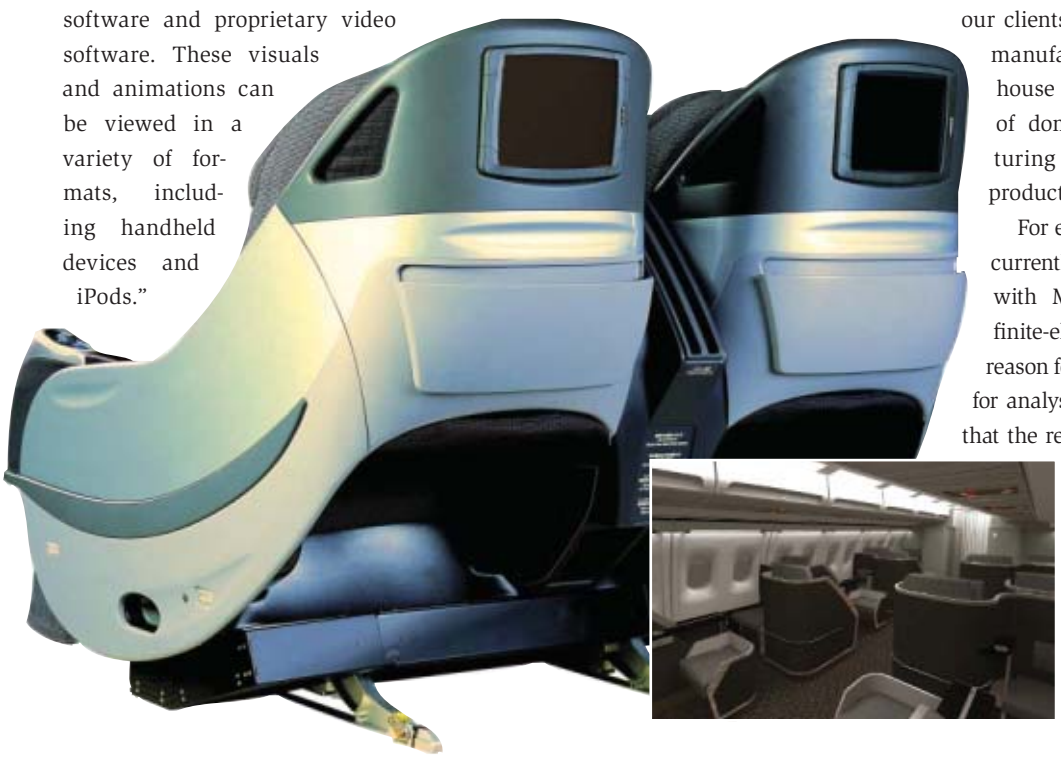
"He probably didn't realize what he was holding was the cast-urethane prototype, not the production-molded piece," Nemec recounts. "[The toss] cracked the housing, but the unit held up. It was still intact."

The final production was done with a stiff, rubbery material that met all of HED's requirements for waterproofing, chemical resistance, and durability—the client specified that the product had to survive a 12-foot drop onto concrete without breaking.

Concepts 2 Reality uses primarily Pro/E from PTC for its modeling tasks. "It's a robust piece of software with few limitations," says Nemec. "One way or another, you can find a method to design or create what you have in mind. The ISDX module [interactive surface design extension], for instance, gives you high-end surfacing capabilities."

Once a concept has been approved by the client, Concept 2 Reality utilizes its industrial design staff to refine the final concepts, which are created in a digital format using Cintiq tablets along with the AliasStudio software suite. "This final selection process is normally completed in a short time, and the concepts then flow into our Design and Engineering department, where our engineers build manufacturable 3D CAD models with a focus on retaining the initial design language and ID," explains Nemec. "During the development process, we will utilize our in-house prototyping for verification purposes via 3D Systems' InVision printer to accelerate the overall development process and to ensure that all details, requirements, and specifications have been met. From this point, we assist our clients in moving the design into manufacturing using the clients' in-house capabilities or our network of domestic and global manufacturing partners to produce the end product."

For engineering analysis, the firm currently uses a partner equipped with Mechanica, Ansys, or other finite-element analysis products. The reason for utilizing a partner resource for analysis, says Nemec, is to ensure that the results are accurate. "The best



B/E Aerospace relies on a combination of physical models (far left) and digital content (inset) to present clients with new concepts.



SurfaceInk utilized Pro/E software to create the organically shaped Command-Play add-on to Tapwave's Zodiac game controller.

way to do this is to use a resource that focuses only on this aspect and not just dabble in it as needed," he says.

Over time, Concepts 2 Reality has developed its own design method, dubbed Composite Design Effort (CDE). To acquire what it describes as "cradle-to-grave intelligence," the company employs multi-disciplinary project teams, which are intimately involved with each project from the launch to the subsequent stages. The turnkey services it offers include research, CAD design, prototyping, testing, and more. For product design, the company relies on its expertise in Pro/E, SolidWorks, and other CAD programs.

SurfaceInk

An ergonomically awkward game controller can kill you—that is, in the virtual world of the game. You're barreling down a virtual highway at 90 mph in a racing game. Suddenly, the handheld device slips from your palm, already moist with anxiety-induced sweat. By the time you recover the device, your virtual vehicle has crashed and burned.

In 2004, the designers at SurfaceInk observed something about the Zodiac handheld gaming device from Tapwave (no longer in business). "We found that the user interface to that device felt cramped, especially for adult hands," recalls Chris Kraeutle, engineering team manager at SurfaceInk. "So we came up with an idea to make an accessory product [a removable grip] that would be molded in plastic. It would snap onto the Tapwave Zodiac unit."

The original device resembled an onboard navigation device, or a PDA in landscape orientation. With SurfaceInk's CommandPlay add-on attached to the back, the dual-handed Zodiac provided firm grips, settling snugly in the sporty Tapwave carrying case.

SurfaceInk uses both Pro/E and UGS NX to help realize its clients' concepts. "Both packages allow us to develop a product in a virtual environment," says Kraeutle. "They also enable us to work with other departments and other partners to manufacture our designs." Kraeutle notes that the software tools are advanced, enabling the group to work in assemblies to craft extremely complex industrial design forms. "There's no limit to building light, high-quality industrial design surfaces in the software," he adds.

Aimed at preserving design intent and providing real-time feedback on how the design can be manufactured, SurfaceInk works as a mechanical engineering consulting firm.

"Our clients choose SurfaceInk to preserve design integrity and deliver a final product that meets or exceeds expectations by using high-end CAD programs such as Pro/Engineer, Unigraphics [now known as NX], and SolidWorks," says Kraeutle. "We collaborate with our clients to understand and define their design requirements. Our experienced mechanical engineers create detailed 3D mechanical structures while preserving complex industrial design needs. We are able to review designs with the client and/or other decision makers quickly due to our ability to assimilate designs and realize them using 3D CAD."

Digital Data Goes a Long Way

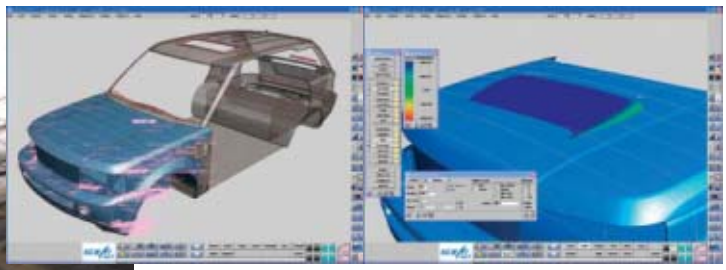
The companies mentioned here, like countless others across various industries, are reaping benefits with digital data that extend beyond the manufacturing and production stages. Consider RKS: Its "2007 RKS Catalog Sampler" features glossy photos of hollow-body and solid-body guitar models in ruby red, trans blue, and satin black finishes, some in the highly organic tribal contour, others in the slightly triangular boomerang shape. Yet, the original RKS brochure was created using Autodesk AliasStudio renderings because the brochure was created before product photography could be done.

"We can build a model quickly, and then take that model and basically make a photograph of it," says Christopher Glupker, senior designer and project manager for RKS Design, RKS Guitars' parent company. "The clients are amazed at how quickly they're able to get a visualization of what it is we're thinking of."

In 2005, RKS Guitars won two Industrial Design Excellence Awards (IDEAs), cosponsored by *BusinessWeek* magazine. RKS was among what the editors call "several surprises." A neon-green RKS guitar from the Pop Series graced the cover of the July 2005 issue of *BusinessWeek*.

Such recycling of the digital design data, according to Greg Fowler, Autodesk's technical manager for Alias Design Products, is characteristic of the current practice in industrial design. "If anything, we're seeing an upturn in this trend as 3D graphics are becoming more and more accepted," he remarks. "We're also noticing an increased use of our real-time visualization technology





(Left) The use of engineering data to create photorealistic advertising content can reduce costs. (Below) Visualization artists prefer to work with polygon-based models rather than the math-heavy CAD data. With ICEM, a user can specify the degree of tessellation desired for each surface area, making it possible to export lighter models.

in AliasStudio and in Showcase products, both of which now give real-time feedback on the image a user is creating."

Clients of Concepts 2 Reality also use digital data in place of photographs in brochures. "Often we do high-end rendering for our clients, and they would use these as their brochure materials," explains Nemec. "Usually, we'd export it to a different package, like AliasStudio, and then do some final touch-up in Photoshop. We've done that with, for example, Rubbermaid products."

One of the advantages to reusing engineering data for promotional materials is realized in cost savings, notes Mike Check, general manager for ICEM, a high-end surfacing product that Dassault Systemes recently acquired. Because the geometrically accurate engineering data would serve as the starting point for the visualization artists, an ad agency could not justify billing a client for creating a product from scratch. "A lot of the Chrysler ads, for instance, are made from digital content," Check points out. (For additional information about this topic, see "Sensual CG," October 2006.)

Not long ago, this digital option was inefficient. The days of the tedious visualization workflow, where you hit the render button and then go brew a pot of coffee as the software builds your image bit by bit, are, for the most part, in the past. "The latest advances in hardware let us deliver photorealistic images in real time—while the user is still making adjustments," says Fowler. "You can essentially output what you see on the screen as a final rendering. The image is being 'rendered' out by the graphics card, so interactively outputting the image is like performing a screen capture—except for the fact that the user can specify the output resolution (the output is not tied to the user's monitor resolution)." Depending on the output resolution, the capture typically takes just a few seconds.

In addition to still imagery, Autodesk's Showcase allows the user to create camera movements within a scene using a tool called Shots. These Shots can be processed out through the graphics card to a movie file without the wait time associated with software rendering.

Reverse Concerns

Previously, the engineering department was the inner sanctum where CAD data lived and died. But it now flows freely through sales collateral, marketing materials, and maintenance manuals. In the case of B/E Aerospace, while the company was working on a $165 million project to design the interior of the new United Airlines first-class and business-class cabins, it was also collaborating with the airline's design agency to develop branding options. For some, the new workflow introduces a set of intellectual property (IP) concerns they hadn't considered previously.

"There are opportunities I see whereby some of our clients could have developed marketing or promotional materials [based on 3D CAD data] before the physical prototype was completed," observes SurfaceInk's Kraeutle. "But in our business [principally consumer electronics], the IP is so proprietary that they don't want others copying the design."

In his experience, few clients would feel comfortable sharing their engineering data with, for example, a graphic artist contracted to develop promotional materials. "They may [create the required graphics] internally," he reflects, "but even with a rendered image [which does not contain 3D geometry that can be extracted], you're still revealing the form and the features of the product." In the case of the CommandPlay for Tapwave's Zodiac, the form was precisely what gave the product a competitive advantage.

"I think that the concern often comes from the clients, the people who hired [the industrial design firms] to develop the IP," says Fowler. "But there are certainly ways to prevent someone from reverse-engineering the 3D files you sent." Fowler believes that the protective stance some original equipment makers are taking can be unnecessary, since the tessellated data usually released to the visualization artists is not sufficient for reverse-engineering a rival product.

"As a software company, Autodesk certainly understands and supports our cus-

tomers'—and their customers'—desire to protect their IP," Fowler adds. "I would simply like to assure our customers that, due to the fact that the requirements for manufacturing are different from the requirements for visualization, it is unlikely that this data can be used to directly reverse-engineer a design."

Check has the same opinion: "The majority of the time, ICEM data, or any other CAD data for that matter, is actually mathematical data, NURBS or Bezier surfaces. They're heavy, difficult to work with." The visualization artists, he adds, would prefer to work with a lighter format based on polygons.

"If you convert the entire CAD model in fine tessellation, it would make the model so difficult to interact with. With ICEM, you can define the density of the tessellation based on the complexity of the sections, so the models are easier to handle," Check says.

Getting Physical

As sophisticated as visualization technologies have become, the physical prototypes are not about to become obsolete, notes Fowler. "There's always going to be a need to validate the physical interaction. That's why our software tools let you output the files for rapid prototyping," he says.

SurfaceInk's Kraeutle has a similar observation: "Generally, the client would request a prototype, especially if you have a complex system, like a consumer electronics item that involves cables, batteries, and PC boards. More than likely, you'd want to build and review a prototype before you release the files for tooling."

B/E Aerospace uses stereolithography, 3D printing, 3D machining, and internal/outside modeling facilities to produce the prototype cabin environments the company needs for its sales meetings. Furthermore, Concepts 2 Reality uses not only stereolithography, but also selective laser sintering. Both methods rely on the CAD files from the engineers to cut and sculpt the desired parts using special 3D printing or laser machines.

SurfaceInk uses rapid prototyping to evaluate early form and function in the design. In most cases, the design has evolved to a point where the sum of the components designed together needs to be evaluated for mechanical assembly in the factory, thermal analysis and airflow, drop testing, and a host of other concerns. "Rapid prototyping gives SurfaceInk the ability to resolve issues in the design before its clients commit thousands of dollars to procure tooling and other necessary components," Kraeutle says.

When interviewed by *Premier Guitar* magazine, RKS Guitars' Sawhney remarked, "While there are a number of manufacturers using CNC technology to build their guitars, RKS has approached this guitar from the very beginning with CNC machining in mind. Each part is designed in the computer, machined to very tight tolerances, and hand-assembled in our shop with great precision."

In fact, all the CAD products mentioned in this article—Autodesk's AliasStudio, UGS NX, Dassault Systemes' ICEM, and PTC's Pro/Engineer—facilitate the rapid-prototyping process through STL file output, which can be fed directly into stereolithography apparatuses and CNC machines.

Not Lost in Translation

"We've become quite good at building mock-ups," B/E Aerospace's Johnson proclaims. "Some people think we can just make them appear, like magic. But it takes an amazing amount of work and effort." About five years ago, while designing a lay-flat reclining seat for JAL's business class, B/E came to realize that its designers and engineers didn't speak the same language—geometric language, that is. The designers worked in various free-form conceptual design packages, whereas the engineers used a number of CAD products. When they needed to share data, they exchanged files in intermediary neutral formats such as ParaSolid, STEP, or IGES. Looking at the incoming design files, Tom Plant, vice president and general manager of engineering for B/E's Seat Products Group, remarks: "There were no features on the surfaces that we could modify."

So B/E decided to adopt a company-wide 3D *lingua franca*, otherwise known as UGS NX, a high-end mechanical CAD program from Siemens UGS PLM Software. The designers worked in NX Shape Studio, a free-form modeler, whereas the mechanical engineers worked in NX Design, a CAD application. Thus, by developing the product concurrently in the same software environment, both were able to edit, modify, and refine each other's files without error-prone and time-dependent translation. The outcome was a business-class seat that reflects both the designers' aesthetic sensibilities and the engineers' manufacturing ingenuity. In 2002, the seat won the Good Design award from Chicago Athenaeum Museum of Architecture and Design, the Japanese Good Design Award, and an *ID* magazine distinction award.

"Our industrial designers are able to work on the same digital model as our engineers without any translation, and that has been a big part of our speed and accuracy," Johnson reveals.

Engineering Realism

This type of increased collaboration between engineers and designers is growing, and may eventually give birth to a new breed of CAD systems that set their sights on the wider media and entertainment horizon, ICEM's Check speculates.

"As companies like Industrial Light & Magic and Sony Pictures Imageworks start to demand realism in their digital content, they'd want to make sure the lighting looks right, the shape looks correct. That's difficult for the compositor to do," Check says. "So if the engineering model is accessible, they won't waste a lot of time rendering something overnight, only to find out the next day that it looks wrong." ❖

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PCI Express 2.0 technology and multi-core processors accelerate complex applications

The Express Way

BY DAVID FAIR AND WES SHIMANEK

From VFX studios to geological imaging facilities, users place increasingly heavy demands on today's workstations. As applications for high-end graphics proliferate, vendors scramble to produce faster, more capable, and more power-efficient machines. Along with this trend, graphics processing I/O is being put to the test.

PCI Express (PCIe) technology has proven to be a flexible, scalable, and, above all, capable interconnect for graphics performance. PCIe replaced the AGP8X (Accelerated Graphics Port) in all new systems when it launched in 2004, and AGP is nearly gone now from the retail systems upgrade market.

Even so, bandwidth needs in the world of imaging will only increase, and the capabilities of graphics controllers continue their dramatic improvements. To meet these burgeoning requirements, the PCI Special Interest Group (PCI-SIG) has released a new PCIe specification—known as PCIe 2.0—which provides double the bandwidth of the previous PCIe generation while maintaining backward compatibility with previous PCI and PCIe versions. Although bandwidth doubling is the key advantage of PCIe 2.0, the new specification also sports a number of other improvements to PCIe that, if somewhat esoteric in details, will positively affect workstation users in every field.

Workstations in Flux

At one time, the term "workstations" referred to a fairly circumscribed subset of computing solutions, produced by highly specialized manufacturers and serving a fairly small market segment of researchers, engineers, and cutting-edge gaming, film, and television production companies.

Today, the situation is different. The continued exponential growth in the processing power of computer chips has blurred the edges of what was once a well-defined marketplace, though, generally, a "workstation" will offer higher reliability (for example, using ECC memory) and faster and more storage than a standard PC client. The current generation of general-purpose computers

significantly outperforms yesterday's workstations, leading them to gain significant share in many once-rarefied markets.

Simultaneously, however, the power and performance needs of graphics professionals have continued to grow, pushing the performance envelope even further. This creates a situation in which workstations continue to sell briskly. Jon Peddie Research reports that the market for workstations grew by 22 percent in 2006 in terms of unit sales, with 706,000 shipped, representing $6.2 billion in sales.

The result is a market full of choices. Not only can workstations be configured with a wide variety and quantity of single- and multi-core processors, but the increasingly specialized uses to which they are put create a strong market for cutting-edge graphics processors, hardware accelerators, high-bandwidth data storage, and high-speed networking. None of this progress would be possible without efficient ways to connect this cornucopia of specialized components to the main processors.

In recent years, PCIe has become the dominant means of making those connections. Its origins stem from the original PCI specification developed in 1993, which represented tremendous performance and flexibility gains over competing bus architectures of the time. As graphics applications pushed the limits of PCI technology, the AGP was developed and became the standard way of attaching graphics to workstations, desktops, and laptops. However, early in the new millennium, the needs of graphics professionals outstripped the capabilities of parallel interconnects like AGP, leading to today's rapid adoption of PCIe.

Even going back to the first generation of PCI before PCIe, the technology was a driver of change in the workstation market, as it was an industry-standard I/O attach point from which many companies could innovate. This differed from the proprietary interconnects of supercomputers and workstations past. With the open specifications, a company could develop high-performance computing components and simply incorporate a leading-edge, universally available interconnect in its designs. The result was greater openness, choice, and competition in the workstation market, driving workstation hardware innovation up and prices down.

PCIe 2.0

While PCIe is serving the graphics and other high-performance computing markets well, it is only a matter of time before it, too, needs to evolve to meet the new requirements of multi-core processors and increasingly powerful graphics controllers. Anticipating that requirement, PCI-SIG has released a new version of the PCIe specification. This breakthrough development for workstations and for computing in general is PCI Express 2.0 (PCIe2).

The major difference between PCIe1 and PCIe2 is an increase in bandwidth. This is good news for workstation users, for whom it's all about speed—whether for real-time memory access when manipulating complex objects, calculating images from physical data, or rendering complex VFX.

The numbers speak for themselves: PCIe2 provides 5.0 GT/s compared to 2.5 GT/s for PCIe1. Looking at graphics applications in general, the benefit of increased throughput is obvious. More bandwidth simply means less time spent sending data back and forth between the graphics controller and the CPU host chipset. For today's critical medical, geological, and scientific imaging needs, in which vast datasets are the norm, PCIe2 has the potential to enable entirely new applications of graphics technology. As PCI-SIG states on its Web site, the inspiration for PCI from its initiation to the present day comes from three areas, the first of which is graphics processing.

Early adopters of PCIe2 need not fear that they will have to buy new hardware. PCIe2 is fully backward-compatible with PCIe1. PCIe2 uses the same form factor, bus widths, connector, pin-outs, and protocols as PCIe1. PCIe2 interconnect is physically different from the original parallel bus PCI, but it is, in fact, software-compatible all the way back to this 1993 technology—meaning it is supported by all production operating systems. This is a significant benefit in the kaleidoscopic universe of hardware currently available. Hardware vendors and end users can implement PCIe2 in preparation for the future without getting rid of the technology they already have.

While the speed jump is the most important new feature, PCIe2 has some additional functionality that makes it even more reliable and robust than PCIe1, as well as functionality to facilitate improved power management. When software detects that not all the bandwidth of PCIe2 is currently being used, dynamic link speed management allows the bus to fall back to the slower 2.5 GT/s rate, thereby conserving energy. Similarly, software can dynamically narrow the PCIe2 bus from 16 lanes (x16) as physically used for graphics controllers, to eight (x8) or four (x4) electrically, also reducing energy consumption based on the workstation's current load.

These new features are all the more important because of the increased power consumption now allowed in PCIe2 for the graphics controller itself. Using a new 2x4 pin connector, GPUs will be able to draw 225W or 300W from PCIe2 buses.

Graphics Applications

Only the most data-intensive graphics applications are pushing the limits of PCIe1 today, but the future is clear. PCIe2 will enable a new generation of imaging technology. The financial and speed benefits of virtual prototyping have made it central to modern manufacturing, particularly in high-tech sectors like automotive and aerospace. PCIe2, along with next-generation multi-core chips, will allow engineers to work with high-defi-



This Intel S5000XVN workstation board, in production today, will soon be replaced with Intel workstation boards supporting dual x16 PCI Express 2.0 graphics slots.

nition digital mock-ups more flexibly and rapidly than ever before. Immersive engineering applications that allow three-dimensional visualization—in effect, virtual-reality digital prototyping—may become a standard way of working.

The petroleum industry has always pushed the limits of data-driven visualization—and bandwidth is one of those limits. New quad-core workstations with PCIe2 adapters will enable industry workstation users to process larger datasets with more attributes in less time. The discovery and analysis of petroleum reserves will become less costly and less time-consuming. With next-generation, high-power graphics adapters enabled by PCIe2, users will be able to visualize these images with greater precision in new, more meaningful ways.

In the entertainment field, faster data transfer and better computers will lead to more transparent technology. Quad-core workstations and PCIe2 graphics cards will accelerate digital storyboarding. Artists will be able to interact with ultra-high-resolution imagery in full floating-point detail—and in real time. Without bandwidth bottlenecks, their imaginations will be free to roam across the digital landscape and produce results more quickly and with less effort. As they say in the movie business, "It's coming soon to a workstation near you."

It's not far-fetched to say that enhanced graphics processing could save human lives. Medical imaging is another bandwidth-hungry field. PCIe2 will let the applications of the future stretch their wings. Doctors and nurses already have a number of ways to visualize patients' bodies in 3D and 4D, inside and out. These "virtual bodies" allow more precise diagnosis and more effective procedures. The larger and more detailed the underlying data, the more accurate the images. PCIe2 will enable a world of portable, high-performance medical workstations that allow a physician to image body systems in real time.

It won't be long before computers with up to eight computational cores, 80 gigaflops of performance, and PCIe2 graphics will usher in the era of the workstation supercomputer. Users will have the processing power and bandwidth to create their most innovative work, experimenting, discovering, and creating more quickly than ever before. PCIe2 opens the door to the graphics of the future.

Looking Ahead

Graphics today help diagnose disease, discover resources, entertain mass audiences, and unveil the secrets of the universe. If I/O bandwidth is limited, those applications are limited as well. In historical perspective, PCIe2 represents yet another increase in computers' ability to help human beings visualize what they cannot see on their own. As these innovations continue to affect our lives in amazing ways, the PCIe interconnect will quietly stay one step ahead of computer graphics innovators everywhere. ❖

AMD and Nvidia are relatively silent about plans for a PCIe 2.0-capable chipset. Nvidia will not comment on new products except to say it will have new AMD and Intel platforms available later this year. Intel, though, has stated it will soon ship boards supporting PCIe 2.0 graphics slots.

David Fair, *formerly of Intel, manages industry evangelism and enabling for I/O technologies in enterprise server and workstation applications, including PCI Express and InfiniBand, as well as 64-bit and virtualization insofar as they affect I/O.*

Wes Shimanek *is the workstation strategic marketing manager for Intel's Digital Enterprise Group. He is responsible for product marketing, where he defines products, platforms, and initiatives for Intel's workstation. He has also led teams in the development and marketing of high-end computer graphic solutions used in medical imaging, immersive visualization, and simulators.*



Nvidia just announced the Quadro FX 570, one of several new professional graphics boards that are PCIe2 compliant.

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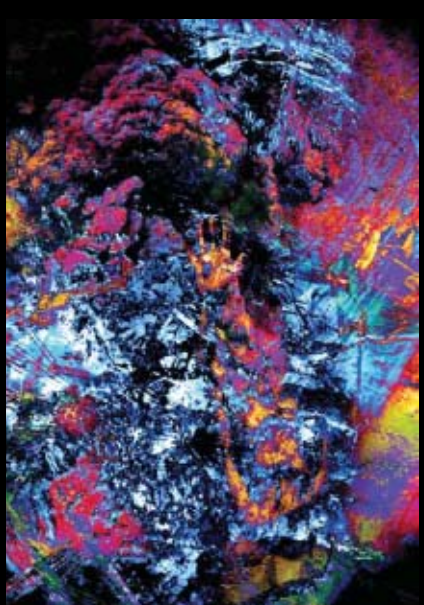
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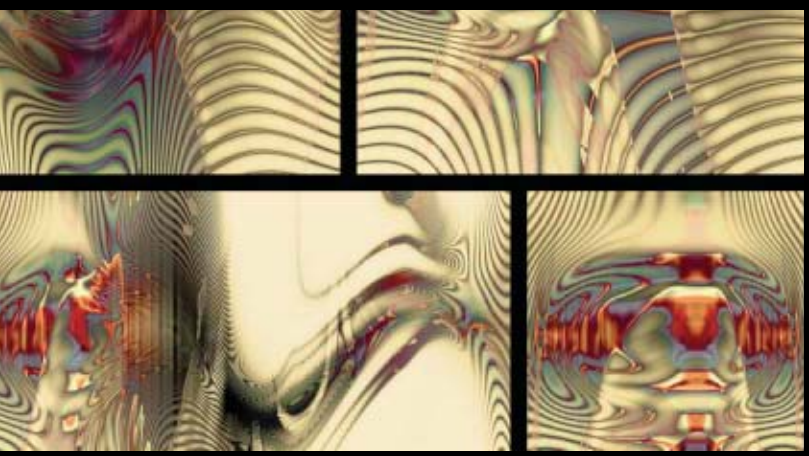
Thread and Carbon, Oil and Steel From Sally Grizzell Larson, this selection, "No. 6" from this series, is a Lambda print. Digital technology was used to capture (by scanning) and integrate (using Photoshop) the various parts of the image, which resulted from a wide range of sources.

Luminous Presence A reflection hologram by Paula Dawson. To accomplish this image, a virtual camera that captured the scene mimicked the viewer's eyes. Thus, the camera used to create the final render was not a creative choice.

Revolution This CG on paper print was crafted by Mostafa Barakate. It was done with Photoshop, with each channel created separately.

Not long ago, the seeds of digital art began to sprout in small communities. Today, the roots of this medium have spread across the globe. Yet, the way in which CG technology and art are united seems to vary from culture to culture. This year, the SIGGRAPH 2007 Art Gallery, with the theme "Global Eyes," celebrated this expanding social awareness of digital media as it shapes, extends, and reflects world views and socio-political issues.

The foundation of this year's gallery is based on multi-cultural experiences. "We look at how we can understand the world and the human experience in it by using the dialog between the human being and technology," says the University at Buffalo's Vibeke Sorensen, who served as this year's chair. To this end, the committee tried to be as culturally inclusive as possible, looking at how technology is integrated with social issues in various parts of the globe.







The show highlighted 100 juried and 50 curated works. Some of these included projects that fell into new areas, such as artist books. Though some may classify these as traditional, Sorensen maintains that they are developing in different directions. This is mainly due to the way technology is being integrated into the world around us, she says. One example of this is the travel journal, created using paper and a camera. "The beautiful paper and tactile quality of the material is so different from a projection, for example," says Sorensen. "Yet this extension of print is mobile, which reflects the fact that people are more mobile in our societies."

A selection of images that were featured in the SIGGRAPH Art Gallery appears on these pages. —*Karen Moltenbrey*

Clockwise from top left:

Sonata Brian Evans created these digital prints on paper. The overall image was crafted by slicing an abstract animation through the time dimension. The score was composed as digital music, and the animation was discarded, leaving the trace behind.

Flow This wall-hung piece by Masa Inakage was produced by deforming 3D models through recursive twisting and bending. Then the models were placed in 3D space to show the inter-relationships among the objects.

Meteor Crater Observatory on Old Route 66, Arizona The images in this digital print series by Dave Poindexter were acquired with a digital camera and then manipulated through the use of masks, filters, and color adjustments.

Stepping Up

How recent students became pros – even before graduation

By Mark R. Smith

The transition from student to professional can be a challenge, a potential debris-filled minefield of questions and problems. How many employment applications does one have to send before hitting pay dirt? Where are the jobs?

And then, there's that burning question: "What exactly do you want to do?"

But for some, it's not a minefield at all. There are those students who pick a nearby school, work at an internship or two, and then land a job they like without much problem. Their transition was about what they had expected. Here, a few young pros share their stories.

John Zilka

Gasket Studios (www.gasket.tv), Minneapolis

Gasket Studios creative director Greg Shultz's simple assessment of John Zilka is he's "an up-and-coming Maya rock star."

So much for faint praise, eh? Zilka, a designer/animator, joined the company early this year as an intern and moved into a full-time position in June, immediately after his graduation from The Art Institutes International Minnesota.

Shultz notes that Zilka already possesses "a soft-spoken nature and a great sense of humor" (the latter being a fine trait to exhibit in this type of industry); those features, coupled with Zilka's technical and creative abilities, add up to a winning combination, he adds.

Zilka could hardly wait to demonstrate his design chops professionally, having been heavily influenced during his early years by the work of those who came before him—notably the folks at Pixar. "I started thinking about this type of career when I was a high school sophomore in Redwood Falls, Minnesota, which is when several movies that were created in a completely animated environment, like *Toy Story,* hit the big screen," he says.

What piqued Zilka's interest wasn't so much the story line. "It was the technical side of the movie that caught my eye."

While Zilka was introduced to Gasket during his internship, the early exposure to the professional environment didn't count toward the fulfillment of his credit requirements for college. "What got me connected there was a classmate, Nate Dorn, who was already interning [at Gasket]," he explains. "They had another spot open, so they brought me in last February. Fortunately, when we graduated June 15, they hired both of us. We started three days later."

The duo first worked together on a music video for producer Rusty Rogers, "who came to school to produce a music video made for his rendition of the tune '10 Little Monkeys.' My role was to design characters and backgrounds, as well as set up characters for animation," Zilka explains, noting that up to seven stu-



(Right) John Zilka transitioned into a full-time position with Gasket Studios after interning with the facility. (Top) One of his recent jobs entailed CG work for this Microsoft commercial.





Kyle Gray began his job at Spy Post even before graduating from San Francisco's Academy of Art. Prior to that, he completed an unpaid internship. Those experiences have helped him with his current work: music video, commercial, and film compositing.

dents worked on the project at once.

Zilka embarked on his career path using Autodesk's 3ds Max, "but during the class I bought a Maya 6 Foundation [also from Autodesk] book on my own and quickly came to prefer it. It's more powerful and offers the user more options, such as particle dynamics and the painting weights."

The young animator discusses how Maya enhanced his creativity on one of his senior projects—a short story about a guy who falls asleep in his bed only to awake and discover that his cat had become a giant, sending him running for his life. "I used Maya to accentuate the cat's fur and the man's clothing, for instance," says Zilka. He also employed Maya on a piece for Microsoft that called for a crow to fly over an ocean and some ships, then land on a buoy. "I rigged and animated the bird," he describes, "then we created the water in Maya, later compositing the buoy and ships, which were all done in [Adobe's] After Effects, into the piece."

All told, Zilka has used the combination of his education, contacts, and talent to make a smooth transition from academia to the work world. "Gasket made my transition really easy, so I got used to the people and the workload before I came to work full time," he says. "The other students at my school didn't do internships for the most part, but I would definitely recommend it to anyone."

Kyle Gray

Spy Post (www.spypost.com), San Francisco

Kyle Gray has a bit of "seniority" on Zilka, having joined Spy Post as an assistant editor/After Effects artist last February—though he didn't graduate from San Francisco's Academy of Art until May.

The majority of Gray's workload at Spy Post involves compositing on music videos, commercials, and features. His previous experience, which he gained at a small production company early in his college career, also includes editing commercials.

The Denver native, who is now just 22 years old, also has an early career that parallels that of Zilka from an experience standpoint, as his interest in postproduction work was sparked during high school. He was 16 when he started cutting skateboard videos "in the X Games mode" and started his own LLC; at 17 he produced skating videos, then cut and distributed product in the western US.

"That's when I decided I wanted to proceed into films and music videos," says Gray. "Then I looked for colleges and came across the academy, so I moved to San Francisco."

Gray had what might be considered different expectations for what he hoped

to accomplish by going to film school. "It was more for me personally," he continues. "I think what you pay for is the creative atmosphere. You don't go there as much for an education. You have to educate yourself with your peers and on the equipment that you have access to."

With those thoughts in mind, Gray began to look for his first professional gigs during his sophomore year and came up with an unpaid internship at Hot Bed in San Francisco. After about a year, he started working on some paid freelance jobs.

And get paid he did, as the freelance gigs evolved to the point that, during his junior year, he was working five days a week with Hot Bed clients like Foote, Cone & Belding for Kikkoman soy sauce while finishing his degree.

"I kept at it until I graduated," Gray says, "but at that point, it almost seemed like school was holding me back from moving ahead in my career." That may have also contributed to holding him back from sleeping when one considers that Gray had also started freelancing for Spy Post by that point. Gray left Hot Bed about six months ago when Spy Post offered what he says was a better atmosphere to enhance his skills as an artist.

Today Gray is using After Effects and Autodesk's Discreet Flame to work on spots for the likes of Hyundai through Goodby, Silverstein & Partners and a music video for the group Air Traffic via Terri Timely. But he already understands that it's nice to stay in touch with old contacts; to that end, he still freelances on occasion with Hot Bed. "I like to keep close to my former employers," he says, knowing that they might be future employers.

As Gray continues to learn while he earns, he looks back at his educational experience as generally positive, but not defining. "School helped many people who I know more than it did me," says Gray, "because I came in knowing what I wanted to do, whereas a lot of them were in the midst of finding that out."

John Sanchez

The Napoleon Group (www.napny.com), New York

The road taken by John Sanchez to his current station as an animator and motion graphics artist at The Napoleon Group in New York City was less direct than those of Zilka and Gray. In fact, his doubts about the financial incentives available in creative fields led him in a different direction initially. "As a kid, I used to draw a lot," says Sanchez, "but I didn't think I could make any money at it." So he acquired a bachelor's degree in finance from St. John's University and worked for such firms as Smith Barney and Chase Bank.

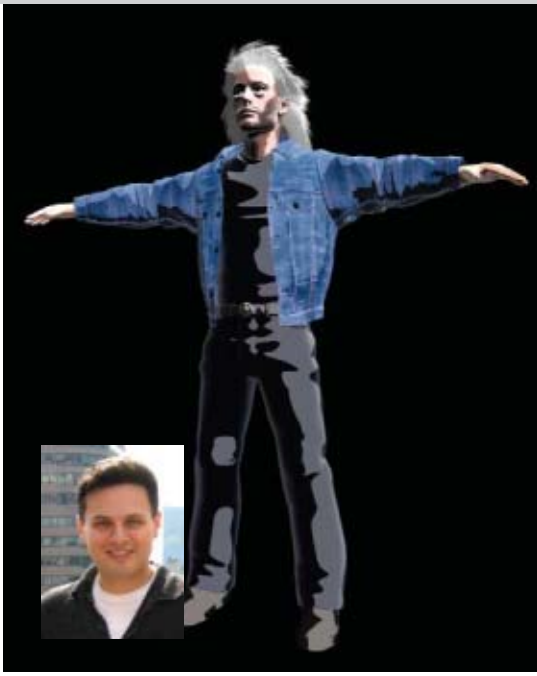
"But it wasn't for me," Sanchez says, and he ended up following his heart after all, though it took a while to see exactly where it was heading. After stints as a talent manager and as an actor—plus the reality check of 9/11—it was back to school, this time at NYU for a master's degree in digital imaging and design at the Center for Advanced Digital Application.

Then, like Zilka and Gray, Sanchez felt ready to apply his developing skills in the field. "I was trying to get an internship my second semester and sent my resume to MTV. It was a surprise when they called me an hour later," he says. "It turned out that the guy doing the hiring knew some of my professors at NYU."

The network needed someone with Softimage skills to provide background graphics for the spring 2006 edition of *MTV Up Front,* the vehicle for executives to unveil new fall shows to advertisers. And it was pretty big stuff: Jamie Foxx performed, and Jessica Alba emceed.

"It went well," Sanchez says. "I ended up using Maya on the Mac due to a lack of available PCs. It turned into a freelance job that paid $300 a day, so that buoyed my spirits and made me feel that I was where I needed to be. But it was only for that show."

The upstart learned Maya at NYU, but taught himself Softimage when he was working on his thesis—it was about rigging and included projects concerning animation and character modeling, which he encompassed in a short animation.



John Sanchez snagged a prized internship with MTV, eventually turning that into a freelance position before his reel landed him his current job at The Napoleon Group.

It was that summer when The Napoleon Group saw Sanchez's reel online and called to set up an interview. An offer eventually came, but not until October, "when I was in the midst of finishing my thesis and I was in 'the zone.'" Fortunately, the facility was able to wait until this past February for him to come aboard. Since then, Sanchez has offered his skills in 3D graphics and compositing using After Effects. So far, he's worked on test spots for Three Musketeers candy bars (entailing a wave of chocolate, requiring him to learn Next Limit's RealFlow). That came in handy for another spot, for Oil of Olay, which featured splashing water.

"3D is my specialty, but they needed someone who knows After Effects, so I learned it. Learning something new—people have to continually do that in this business," Sanchez says.

Sanchez has a somewhat philosophical overview of his career to date: "I don't know if it was what I expected, but I can tell you now I feel at home. Everything in my past led me to where I am now." ❖

Mark R. Smith is a Maryland-based freelance writer covering the film and video post and production business. He can be reached at msmith1277@aol.com.

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NEWS FROM siggraph 2007

SOFTWARE

ANIMATION

Toon Boom Tools

Win Toon Boom previewed Toon Boom Studio 4, designed to aid users in producing animations for video, Web sites, television, film, games, and mobile devices. Studio 4 offers support for Adobe Illustrator layers, a Vectorize Preview window, improved drawing tools, Alpha Onion Skinning, and support for the Tablet PC OS for Windows XP and Vista.



Toon Boom Animation, Inc.; www.toonboom.com

Vue 6 xStream on OS X

Win • Mac E-on Software has announced the availability of its Vue 6 xStream for Macintosh OS X. Vue 6 xStream offers CG professionals a tool set to integrate Autodesk Maya, NewTek LightWave, or Maxon Cinema4D projects in realistic 3D environments. Vue 6 xStream combines environment creation utilities, rendering technologies, and animation tools. It extends the feature set of Autodesk Maya, NewTek LightWave, and Maxon Cinema4D to include support for Vue's natural environment technologies. Vue 6 xStream is designed to integrate into virtually any professional production pipeline, from architectural visualization to game, broadcast, and film. Vue 6 xStream is compatible with Mac OS X 10.4 (Universal Binary) and Widows XP and Vista (32- and 64-bit) operating systems. Vue 6 xStream retails for $895, with upgrades and educational discounts available.

E-on software; www.e-onsoftware.com

Massive Support

Win • Linux Massive Software has updated its Massive AI-driven 3D animation system to Version 3.0 with improved dynamic hair and fur, interactive viewing of subdivision surfaces, and layer simulations. Version 3.0 also gains native support for Mental Images' Mental Ray high-end, photorealistic rendering software. Massive software aids artists in producing realistic character animation with up to hundreds of thousands of autonomous performances. Native support for Mental Ray within Massive provides customers greater options for rendering Massive scenes and enables an optimized workflow for applications and pipelines that rely on Mental Ray. Massive 3.0 is now available at a cost of $17,999 per license. Massive Jet 3.0 is available for $5,999 per license.

Massive Software; www.massivesoftware.com

Reallusion Releases

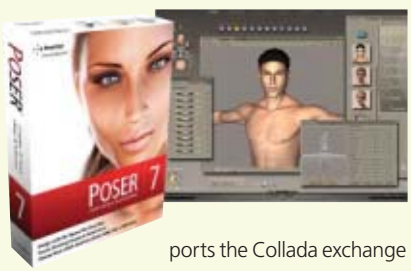
Win Reallusion has upgraded its iClone and CrazyTalk software applications for students, directors, animators, and previsualization professionals. iClone 3.0 features an improved real-time engine and such character animation enhancements as motion path draw and follow, in-scene motion editing, and IK and FK animation. Its directing tool set adds game-style right click reticule menus, in-screen picking and editing of objects, a new multi-camera and lighting system, and multiple undo. iClone 3 visual enhancements include real reflection and refraction, facial normal mapping, and environmental sky, water, and terrain elements with character terrain following. CrazyTalk 5 offers core facial animation technology with finer facial fitting for multiple character styles, including people, animals, cartoons, and non-human characters. Additional features in Version 5 are Bezier curve facial fitting, multiple 3D profile options for fitting facial types, and an interface for facial emotion editing.

Reallusion; www.reallusion.com

3D FIGURE DESIGN

Poser Pro 7

Win • Mac E frontier has released Poser Pro 7 software, which combines Poser 7 with professional-level application integration, a 64-bit render engine, and network rendering support. For digital content production, previsualization, gaming, and movie production, Poser Pro supports the Collada exchange format and offers the ability to host Poser scenes in Autodesk 3ds Max and Maya, Maxon Cinema4D, and NewTek LightWave. The professional version also boasts increased support for Adobe Photoshop CS3 Extended, the ability to export HDR imagery, and more than 1GB of 3D content. Poser Pro 7 is scheduled to ship this fall.



E frontier America, Inc.; www.e-frontier.com

VISUAL EFFECTS

Emitter Collection

Win • Mac Wondertouch, a developer of particle-effects creation tools, has unveiled three new libraries in its Professional Emitters software line for use with the company's ParticleIllusion 3.0. Each library contains 30 ready-to-use, particle-based emitters that enable digital content creators to customize particle effects projects quickly and efficiently. The Wondertouch Pro Emitters collection

products

now boasts a total of 360 ParticleIllusion 3.0 emitters, which are arranged into 12 themed libraries. The libraries encompass motion graphics, artistic backgrounds, text, abstract effects, and real-world effects, such as explosions, fire, auroras, and breaking glass. Each Professional Emitter Library contains 30 customizable emitters. The new Wondertouch Professional Emitter Libraries—Pyro 1, Pyro 2, and Hearts—can be purchased at a cost of $39 each, or together for $90. Professional Emitters Complete, a collection of all 12 libraries, is available for $329.

Wondertouch; *www.wondertouch.com*

Two Tools

Win • Mac Digital Anarchy has released ToonIt 1.0 for Film/Video, and Primatte Chromakey 3.0 for use with Adobe Photoshop. The ToonIt for Film/Video cartooning effects package lets users to create cartoon shading and lines from video and film sources. Four filters in ToonIt speed tasks such as hand painting and rotoscoping. ToonIt is compatible with Adobe's After Effects and Premiere Pr , as well as Apple's Final Cut Pro and Motion. Primatte Chromakey brings film/TV chromakey to Photoshop users and preserves details, such as wisps of hair and sheer material. Version 3.0 features more automated masking tools and improved blending between subject and foreground. ToonIt for Film/Video is priced at $295, whereas Primatte Chromakey 3.0 costs $299.



Digital Anarchy; *www.digitalanarchy.com*

SIMULATION

Atmospheric Effects

Win • Mac E-on software, makers of Vue software for producing natural-looking 3D environments, has announced the availability of Ozone 3.0 for use with Autodesk 3ds Max and Maya, Maxon Cinema4D, NewTek LightWave, and Softimage XSI. Ozone 3.0 aids artists in creating and rendering scenes with realistic 3D clouds and spectral atmospheres. The latest version features spectral and volumetric atmosphere models based on real-world atmospheric behavior, a new spectral engine, 3D clouds with optimized volumetric cloud layers, and a library of more than 100 predefined atmospheres. Its new spectral atmosphere technology models the behavior of the Earth's atmosphere to produce various atmospheric effects. Ozone 3.0 is compatible with Windows 2000/XP/XP64/Vista32/Vista64 and Mac OS X 10.4 (Universal Binary) operating systems. Ozone 3.0 starts at $199. An upgrade from Ozone 2 is priced at $99.

E-on software; *www.e-onsoftware.com*

Next Limit Upgrades

Win • Mac • Linux Next Limit Technologies has released Maxwell Render 1.5, which sports new matte material, an enhanced material editor, drag-and-drop functionality, and new SimuLens and Shift Lens utilities. The company also launched new sections of its Web site, including specific pages for each supported plug-in, video tutorials, and other resources. Next Limit Technologies has updated RealFlow4 Version 4.3 with several environment variables to improve and smooth the integration of RealFlow in company pipelines. An updated version of the company's Cinema4D plug-in is now available for download and compatible with Windows and Mac platforms.

Next Limit Technologies; *www.nextlimit.com, www.realflow.com, www.maxwellrender.com*

RENDERING

Deadline 3.0

Win • Mac • Linux Frantic Films Software, a division of visual effects studio Frantic Films, has launched Deadline 3.0, the latest version of the studio's renderfarm software. Deadline 3.0 assists users in and rendering on Microsoft

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EDUCATION & TRAINING

FOR IMMEDIATE RELEASE:

Due to a special Swedish government initiative students from around the world now have the opportunity to attend an on line masters accredited games production course for one year. There is no fee for attending and the total cost for the student (course material) should be no more than 200 USD. Sweden is known in the industry for it's skilled game developers and some really successful studios such as Starbreeze (Darkness), Dice (Battlefield 1942), Avalanche Studios (Just Cause) and Grin (Ghost Recon). During September (the admission period) 120 students from around the world can join in and start developing there own games. Supported by teachers, who know the industry, students have a good chance to succeed in there efforts to break in to the industry. Guest lecturers from market leading companies such as Sony Computer Entertainment, Microsoft Games, Ubisoft, EA and ID Software also contributes to the courses with there knowledge and practical insights. Log onto www.hgo.se/igps <http://www.hgo.se/igps> for more information.

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Frantic Films Software; *http://software.franticfilms.com*

MOTION CAPTURE

Icarus Studios Viewer

Win • Mac Icarus Studios, a platform and tools provider for builders of 3D virtual worlds, MMOGs, and simulation projects, debuted a streaming motion-capture viewer. The new solution enables multiple actors, cameras, and virtual props collectively to be viewed in real time while being captured. The technology is available from Motion Analysis, a provider of motion-capture systems, as Talon Viewer. The tool will be commercially available by the end of the year.

Icarus Studios; *www.icarusstudios.com*

COMPOSITING

Eyeon Fusion64

Win Eyeon Software has introduced Fusion64, reportedly the first 64-bit desktop compositing application on the market and the first desktop compositor in the industry to break the accessibility limit of 4GB of both virtual and physical memory. Fusion64 is designed to help Fusion artists better reap the benefits of today's multi-core and multi-processor systems. The 64-bit version offers OFX plug-in support, a new Vector Motion Blur tool, enhanced 3D scene importing, 3D LUTs accelerated by GPUs, Python scripting, and expanded metadata handling for DPX, Cineon, and OpenEXR formats.

Eyeon Software; *www.eyeonline.com*

HARDWARE

CAD

Go Pro

3D Systems Corporation, as part of its new Go Pro campaign, presents its Sinterstation Pro SLS and ViperT Pro SLA systems for the production of accurate engineered parts. Taking advantage of new ProScanT imaging technology, the Sinterstation Pro SLS and ViperT Pro SLA enable designers and engineers to create precise, ready-to-use parts directly from a 3D CAD model. Adhering to strict tolerances and deadlines, these systems can build parts as large as 60 inches long with fine features and crisp edges.

3D Systems; *www.3dsystems.com/pro*

NAVIGATION DEVICES

3Dconnexion and Blender

3Dconnexion announced that its line of 3D navigation devices is supported by Blender, a free, open-source 3D content-creation software suite. Designers and animators can use 3Dconnexion's SpaceNavigator 3D mouse with Blender for an improved design experience while animating, rendering, modeling, texturing, and creating interactive 3D applications, such as games. The SpaceNavigator 3D mouse, the latest addition to 3Dconnexion's product family, features a controller cap that can be pulled, tilted, or twisted to simultaneously pan, zoom, and rotate 3D models. SpaceNavigator Personal Edition and SpaceNavigator Standard Edition are priced at $59 and $99, respectively.



3Dconnexion; *www.3dconnexion.com*

InterSense Solutions

InterSense, maker of motion-tracking technology, has released MicroTrax user-interface devices for its IS-900 inertial-ultrasonic motion-tracking system. The new MicroTrax devices offer a small head tracker that uses passive and active stereo glasses in 3D applications, a small clip-on power pack, an ergonomic handheld wireless wand for immersive-display applications, and a rechargeable docking station. Another new release, the IS-1200 VisTracker is an inertial-optical tracking system offering mobility for building wide-area tracking in industrial settings and augmented/mixed-reality applications.

InterSense; *www.intersense.com*

VIDEO

SeeFile Collaboration

SeeFile Software, a developer of Web server software for sharing media files, together with Intelligent Gadgets, demonstrated the benefits of a combined video-enabled collaborative review-and-approval system during SIGGRAPH 2007 in San Diego. The system includes SeeFile 3.0 and Intelligent Gadgets' SyncVUEpro Skype-based media review tool loaded on an Apple Mac mini server with 1TB of hard-disk space. The combined solution enables large video files to be uploaded, downloaded, and reviewed online over the Internet. The hardware/software bundle enables a video editing facility or educational institution to create a video-sharing server for remote review. The solution is priced at $1995 and is available from SeeFile. The software-only bundle is priced at $995.

SeeFile Software; *www.seefile.com*

3D SCANNER

Immersion Scanner

Immersion has introduced a laser scanning solution for six-degrees-of-freedom MicroScribe digitizing systems. The MicroScribe digitizer and RSI laser system quickly collects point-cloud data of 3D objects for applications such as rendering and visualization. Software transforms the point-cloud data into polygon data stored in native industry-standard file formats. The MicroScribe laser solution is designed to be lightweight and compact, measuring six inches square with a palm-sized scanner controller.

Immersion; *www.immersion.com*

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