

Image Capture — Redefining the DCC Process

3D modeling is hard and let's face it, there are millions of users who can benefit from this technology but don't necessarily need to learn to use it – doctors and medical researchers make fine examples. Image capture or scanning is a technology that allows content to be created in a less painstaking fashion. And as long as the resolution (either polygons or point clouds) is high enough for the intended use, serious time and expense can be saved over hand-modeling. In fact, it's entirely possible that in the future, hand modeling will be done mainly to capture unreality.

3D image capture, also known as scanning, is the process by which the x,y,z coordinates of an object are captured, allowing for the creation of a 3D model. The process can be optical, laser, X-ray or mechanical, and some scanning technologies capture not only the object's geometry, but its color and texture. Any application that requires the use of 3D models of actual objects can benefit from scanning techniques.

Image capture is especially useful in industrial design and manufacturing. Reverse engineering allows engineers to acquire 3D data about an object when specifications aren't available or it is necessary to quickly translate the object

into a 3D model. Image capture is also used to create molds for manufacturing.

A burgeoning application for 3D scanning is in the field of archiving. Specifically, museums are having artifacts scanned to create interactive displays, preserve the integrity of ancient objects, and create a record of antiquities. Cyberware's scanning technology has been used at an archaeological excavation near Mount Olympus in Greece, on the T-Rex skeleton at the Field Museum in Chicago, and in Stanford University's project to scan Michelangelo's works in Italy.

In the future, we expect forensics and accident reconstruction to be lucrative market segments for 3D image capture as well.

Entertainment uses for scanning are myriad and include cut scenes for games, film storyboarding, objects for inclusion in films and games, even products being scanned for 3D animated advertising (action figure toys are created by scanning the actor in costume).

There are three basic groups that can benefit from image capture tools. The first consists of animators, modelers, and designers working in 3D to create scenes or objects for games,

INSIDE DCC

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Repeat after me: 3D modeling is H-A-R-D. The tools that provide shortcuts to 3D content creation are already wildly successful and destined to be even more so.

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Senior Analysts: Samantha Staples (sams@acaciarg.com)
Michael Arrington (michaela@acaciarg.com)
Christine Arrington (christinea@acaciarg.com)
Contributing Editor: David Duberman (spectrum1@broadview-net.net)

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films, product design, engineering, and more. This group has the technical ability to generate from scratch any model or animation sequence they need, but are good candidates for scanning because it saves time and money. However, ease-of-use improvements in 3D modeling software, usually made only in small increments, could shorten creation cycles and thereby affect this group's willingness to adopt image capture tools.

The second group consists of architects, web designers and others who are perhaps not as skilled in 3D modeling or animation, need only a small number of 3D models for a specific project, or simply don't have the staff or desire to do the required work. Users in this group are good candidates for image capture and 3D model libraries. This user group is more likely to use the services of a scanning service bureau rather than purchase the equipment themselves.

The third category consists of users for whom 3D is a means to an end. This includes the medical profession, scientific research, the military, and other groups who want to use 3D data as an analysis tool. These users require an end-to-end solution that not only captures the data but translates it as well, and their pockets are frequently quite deep.

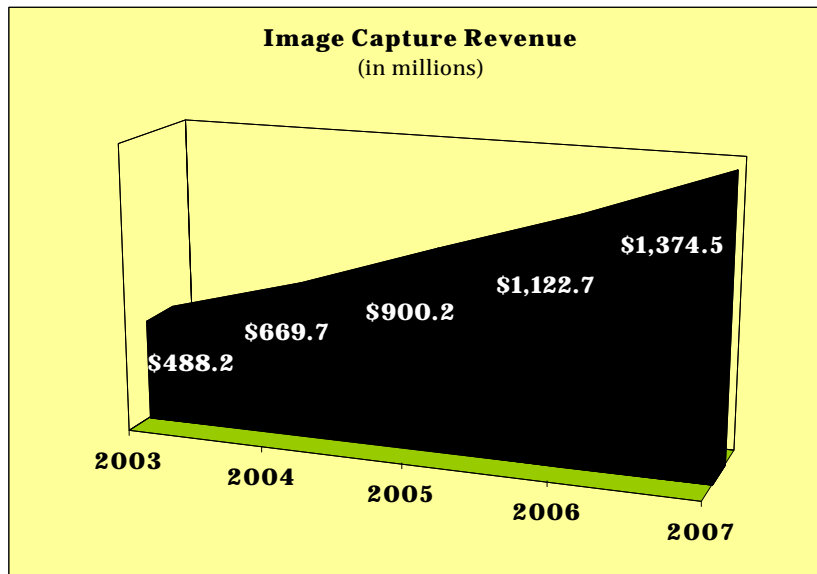
Images can be captured via several different types

of technologies. And the term "image capture" can be used to refer to everything from capturing the geometry and texture of a building to merely capturing a facial texture to map onto a template of a human head. Although the entertainment industry springs immediately to mind as a major market for image capture — especially facial and full-body scanning — toolmakers are discovering other industries that are likely to prove more lucrative.

One company specializing in capturing images of the human body is 3Q Technologies, with offices in Atlanta and London. As recently as

last year, 3Q's 3dMD line of healthcare-oriented products accounted for 90% of the company's business. Using 3Q's optical-based technology, images can be captured in as little as 0.002 seconds for a single frame, making 3dMD extremely effective in pediatric treatment — children typically cannot be counted on to sit still for long. By comparison, laser-based systems can require from 20 to 60 seconds to capture the same amount of data. 3Q's medical customers also include surgeons performing facial and breast reconstruction—they are able to use 3dMD to not only assess the patient physically, but to communicate planned changes to the patient.

The resolution (65,000 polys per face) and accuracy required by the medical profession has helped 3Q



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refine its technology to new levels of quality, and the company has recently added Disney to its list of customers.

3Q's technology for the non-healthcare sectors is sold under the Qlonerator name. The system projects a random pattern onto the subject and high-resolution digital cameras photograph the subject from several angles. Algorithms compare the data with the known distances between the cameras to create a 3D model of a face or body. 3Q has also developed a "passive stereo" system that uses natural light – the data is captured by triangulating directly from surface details.

3Q is just one of almost 80 companies offering some type of image capture technology – either hardware or software or both – making

this a highly competitive market. In 2003 this segment is expected to generate over \$488 million in revenues worldwide. Growth will occur at a CAGR of over 29% through 2007, bringing revenues to over \$1,374 billion.

Although speed and resolution improvements

will keep revenue flowing for the foreseeable future, growth is going to be tempered by the fact that there are a finite number of customers for this technology and many of them – especially the smaller ones – can be expected to use scanning service bureaus rather than purchase the systems outright.

The table on this page lists some of the companies offering image capture technology – most systems use a pattern of laser or regular light projected on the object. Mechanical systems actually

"trace" the contours of an object, and photography-based systems use digital cameras and multiple shots to capture surface details and create a 3D model. ♦

3D Image Capture			
Company	Product	Technology Type	URL
3D Digital Corp.	3D Digital	Laser	www.3ddigitalcorp.com
3D Scanners	Reversa, Replica, ModelMaker	Laser	www.3dscanners.co.uk
3Q Technologies	Qlonerator, 3DMD	Optical, Photography	www.3Q.com
Aracor	Konoscope series	X-ray	www.aracor.com
Arius3D	Foundation	Laser	www.arius3d.com
Basis Software	Surphaser	Laser	www.basissoftware.com
CamSys Inc.	ShadowBox	Video	www.camsysinc.com
Cyberware	DigiSize	Laser & Video	www.cyberware.com
Cyra	Cyrax 3D	Laser	www.cyra.com
Digibotics	DigiBot	Laser	www.digibotics.com
Eyetrionics	ShapeWare	Optical	www.eyetrionics.com
Faro Technologies	Faro Arm series	Mechanical	www.faro.com
Genex	Rainbow series	Optical	www.genextech.com
Geometrix	FaceVision	Optical	www.geometrix.com
Immersion	LightScribe, Microscribe	Laser & Video, Mechanical	www.immersion.com
InSpeck	3D Capturor	Optical	www.inspeck.com
Laser Design, Inc.	Surveyor series	Laser	www.laserdesign.com
Mensi	Mensi series	Laser	www.mensi.com
Minolta	Vivid	Optical	www.minolta.com
Olympus	ScanTop	Optical	www.olympus.com
Perceptron	ScanWorks	Laser	www.perceptron.com
Polhemus	FastScan	Laser	www.polhemus.com
Renishaw	Cyclone, others	Mechanical	www.renishaw.com
Roland	LPX-250 Laser Picza	Laser	www.rolanddga.com
ShapeGrabber	AI2400	Laser	www.shapegrabber.com
Singular Inversions	FaceGen	Photography	www.singularinversions.com
Steinbichler	Comet series	Optical	www.steinbichler.de
Virtual Clones	Virtual Clones	Photography	www.virtualclones.com
Wolf & Beck	Sensorik	Laser	www.wolfbeck.com

Source: Acacia Research Group
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Product Review: Effect3D Studio

By David Duberman

The 3D graphics industry tends to forget that there's a market for software that can fulfill some basic requirements without costing an arm and a leg. Reallusion of San Jose, CA has not and, in an attempt to reach this market, recently introduced Effect3D Studio (E3DS), a \$100 Windows program. As you might expect, E3DS isn't really on a level with programs like 3ds max and Maya, but for the money it offers a relative wealth of functionality.

I'll start with the limitations. E3DS can animate and render only one 3D object at a time. There's no key-framing animation capability; you can animate only using one of the built-in procedural animation methods. The maximum rendering size is 800 x 600, and E3DS doesn't support the standard AVI and MOV animation formats. But even with those restrictions, it can do quite a bit.

The first E3DS module is Project, where you can save and load projects. Each project appears with a thumbnail in the library. The preview window gives you interactive controls for zooming, panning, rotating, plus a reset function. In addition, you can choose preset views such as Front and Top, and one of four lens focal lengths for varying degrees of perspective.

The Background module is fairly straightforward; the program comes with a number of sample backgrounds, and you can import your own in BMP, GIF, or JPG format. If it's larger than the supported resolution, it's automatically resized.

Once you've selected a background, you can add one of the supplied 3D objects and then move, rotate, and scale it on one or two axes at a time. E3DS comes with a large selection of objects such as cartoon animals, small appliances, architectural shapes, leisure, signs and symbols, sport, and web design. The objects are simple but handsomely designed, and are well suited to the types of projects a non-professional might want to tackle. And some of the objects even include their own animation, such as a clown juggling. But if you need something else, you can import objects in 3DS format. For importing 3D objects and backgrounds, the program supports drag and drop from Windows Explorer.

A common application for this type of program is to create 3D text and E3DS is no exception. You can use

any of 12 different bevel types, change the width and height separately, and set the resolution of the text as well as the depth of the extrusion. Among the included styles are still text, optionally against a simple background such as a word balloon; a nice variety of animated effects such as each character successively spinning into place; and scenes such as a brush painting the text onto the screen.

One of the most impressive modules is Rendering Effects – these include standard with a bump mapping option, various toon and hand-drawn styles, materials such as brass and marble, and artistic styles that make the image look as if painted with a dry brush. These work quite well and can give the rendered output an original look that might be difficult to obtain even with more sophisticated programs.

The material module is fairly straightforward, but offers some advanced options such as different mapping methods and tiling amounts, plus transparency mapping. More extraordinary is the animation module, with categories such as simple movement (different rotations) and biomorph, with some difficult-to-describe but original animations. My favorite category name is "Animal Act," which is not what you might suspect, but offers movements such as a pet wriggling with pleasure.

Other modules include Lighting, with up to four light sources, and Image Processing, where you can modify the object and background tonalities, apply a glowing effect, and add shadows. When it comes time to export, you can choose from the same three formats: BMP, GIF, or JPG. Extra functionality comes in the form of the Web Effect Composer module, which lets you apply JavaScript functionality without having to write scripts; and Composer Page, which lets you combine multiple animation clips into a single composition with cut or dissolve transitions between each.

For \$100 Effect3D Studio provides more functionality than you might expect. So if your goals for 3D animation are relatively modest, and especially if you don't want to wrestle with the steep learning curves of the more advanced programs, this just might be your ticket to self-expression in the 3D arena.

(www.reallusion.com)

Excerpted from Spectrum, 28 July 2003. For more information or to read the entire review, visit www.3dlinks.com

The Future of Game Development The Mature Mindset

The changing profile of the average gamer is becoming a significant issue in gaming.

The first couple of generations of hardcore gamers are growing up, and questions are beginning to arise about how to keep these gamers playing once they're past the age of the "typical" video game player. No one wants to see a gaming version of the Peter Pan story, wherein gamers forget all about this pastime once they reach adulthood.

Because there's a seemingly unending supply of young people, many in the industry might say that mature gamers can be discarded—there's more where they came from. But as the developers themselves age, hopefully they'll see some value in targeting mature gamers in addition to the younger, core group.

First, we have to define the factors that make the mature gamer unique.

It's not just chronological age we're talking about, although certain lifestyle changes are arguably chronologically-based. Mature gamers have less time for game play than younger players. There are not a lot of two- to three-hour stretches where an adult has nothing to do. Teenagers will be the first to admit that they frequently play games in an attempt to waste time, or at least make it go faster, and they can afford to devote hours on end to playing video games. Beginning with young adulthood, more responsibilities present themselves and the amount of available game playing time is seriously reduced. And many mature players, feeling these time pressures, want to do something interesting with their free time.

Many game titles are complex and require a significant time investment in order to develop strategies for successful game play. To appeal to older players with time constraints, games need to be more intuitive – challenge levels shouldn't be set so high that initial stages can't be fairly easy to learn and master. There should be a level of rewards that can be achieved in the

earliest stages of game play.

The average game is not very forgiving when a player is distracted—and real-world responsibilities such as preparing dinner, answering the phone, changing a diaper, etc. can be very distracting indeed. With a minute's inattention, most players would be killed and the game play would be over – or it's necessary to continually pause the game play to attend to adult responsibilities. Will it be possible to create games that can be cognizant of a player's attention level? Perhaps such a game could go on "autoplay" for short periods of time when left unattended. At the very least, we should think about letting the players select this option at the beginning of play.

Because the mature player's time is at a premium, it's important to be aware of the fact that time investments need to pay off. If this player devotes ten hours to learning a game only to find out it isn't very good, a little bit of harm is done to the entire industry. Mature players probably have the financial resources to try another title, but do they have the time? Will they mistrust video games?

Game developers can help inspire confidence among mature gamers by creating titles with certain familiarity such as sports stars or common themes that are known to the players. In addition, game developers need to look carefully at the types of titles that have managed to span age groups and genders – titles such as *The Sims* and sports games – and try to isolate the factors that make these titles a success.

The Sims is not a linear game and as such doesn't really have an objective, which appeals to many gamers outside the hardcore category. It lets the gamer devote a limited amount of time, if necessary, yet still achieve objectives. Sometimes older players want a game that's not stressful and doesn't isolate them from their environment. The player who puts in the effort will be rewarded, but game play can remain in the background

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when necessary. Older players seem to be interested in the overall environment of the game, rather than just killing opponents. This requires strengthening the storytelling and character development aspects of video games.

Relying solely on comic books and films for gaming content could lead to creative bankruptcy for the games industry, but future moviemakers will have grown up playing games and it's likely we'll see even more conver-

gence between the two genres in the not-too-distant future.

Finally, as developers themselves begin to age, they'll make games that interest them and their older audience. These titles will likely reflect world events and popular culture, and characters will have fuller ranges of emotion. There will be room for diverse games, just as there is diversity in the visual effects industry—think *Monsters, Inc.* with Sully's millions of animated hairs versus *Southpark's* Cartman. ♦

Visions of the Future—Prognostications from E3

The Electronic Entertainment Expo, or E3, is the biggest forum for announcing new game titles. Unlike GDC, which draws mostly game developers as an audience, E3 brings distributors, developers, and every kind of vendor imaginable together in several giant exhibit halls. The panel discussions at this event go beyond the how-to's frequently found at GDC to include various business aspects of the gaming industry.

One of the panels this year featured a bit of prognostication by several game industry veterans. They were asked by the moderator to share their visions of the future of gaming, in the near future and by 2010.

Robert Huebner, Nihilistic Software – Consoles, televisions, and a number of other devices will all be networked in the near future. By 2010, games will be more convincing, with a visual convergence between PC games and console titles.

Kim Pallister, Intel – In the near future home computing networks will advance to the point where a myriad of interconnected household devices will play movies, games and music. By 2010, expect games to have gained recognition to the point where they're considered as important an artistic medium as film or novels.

*David Perry, Shiny Entertainment – Game characters will be created and stored as mathematics in order to be complete scalable. Graphics will be much better by 2010. They won't just look better, the improvements will be more substantial. Fantasy will be making a big comeback as a game genre. Celebrities will become more involved in licensing and fantasy world appearances. Gamers will want more freedom of play as is currently the case with *The Sims*.*

Fred Swan, Logitech – In the near future millions of people will be connected to a high-speed global network via PDAs, home computers, consoles, etc., and distributed computing across all these devices will lead to much more powerful computing. 2010 will bring a marked increase in interactivity. Games will use high-definition displays and the resolution will need to increase accordingly. Artificial intelligence will be used to create characters that become aware of you when you're in the vicinity of the console, and beckon you to begin playing. "

News Items



There's a new **1** logo from our friends at Alias|Wavefront, and a shortened name

to go with it. In addition to the new logo, Alias has announced the release of the Personal Learning Edition of Maya 5. Remember, the PLE was in large part responsible for Alias' repricing strategy—the hundreds of thousands who downloaded PLE became instant targets for a more reasonably-priced version of Maya.



Instant **2** Effects is a new company founded by former

employees of both Alias and Discreet—most notably, Mike Wilson of the former and Phil Miller of the latter. They've been promising to bring advanced content to PowerPoint presentations and, after seeing their demonstration at Siggraph, we're pleased to report that their product looks like a winner. In the next issue we'll take a look at OfficeFX.



Digimation is taking **3** Discreet to task. On October 7 of

last year Digimation Inc. filed a demand for arbitration against Autodesk alleging breach of contract and interference with prospective economic advantage and business relations. No one's talking publicly about this but Digimation is citing the circa 1998 preferred publisher agreement that set the Louisiana-based company up as the number one provider of proprietary and third-party plug-ins for 3ds max. Autodesk has countered that Digimation has failed to perform under the terms of the agreement, and the arbitration process has just been completed.

If we had to guess (and let's, shall we?) we would say Digimation's president, David Avgikos, was dissatis-

fied with Discreet's representation of 3ds max sales forecasts and installed base numbers.

Any changes to the Discreet/Digimation relationship will, no doubt, be revealed in due time.



We certainly **4** weren't the

only ones to question the direction Adobe seemed to be headed when it originally announced Atmosphere—virtual worlds, for god's sake? Now we're in the position of having to eat our words, because Atmosphere is killer. Granted, it's not making 3D content creation as easy as Photoshop, but we promise you'll be seeing Atmosphere content in some surprising applications. In a future issue of DCC we'll share what we're allowed to tell you.



The September **5** 2003 issue of DCC will feature full

coverage of this year's show, including in-depth articles on the most exciting product announcements. And there were some very exciting announcements. 3D graphics didn't jump onto every computer and handheld device but don't buy that funeral suit just yet. 3D is showing up in a lot of innovative ways, and 2D is looking pretty respectable as well.



Bauhaus Software will **6** soon begin shipping Mirage, an all-new version of the Aura product previously offered by NewTek, which in itself was

a reincarnation of TVPaint from the French company of the same name. Mirage is a tool that encompasses content creation in the fields of broadcast/video, 2D and cartoon animation, compositing and special effects. Stay tuned for more details.