Groundbreaking Contour™ Reality Capture System Heralds New Era for Computer-Generated Imagery

QuickTime and WebTV Pioneer Steve Perlman Pushes Digital Envelope to New Threshold with Volumetric Cinematography

(July 31, 2006 -- BOSTON -- SIGGRAPH) For the first time, motion picture and video game makers will be able to use digital cameras to accurately capture and depict full-motion, photorealistic computer-generated characters and other imagery. This breakthrough is a result of a revolutionary new cinematography process that promises to dramatically reduce production costs and give content producers far more creative control over the visual effects process.

“Mova™ Contour takes us from motion capture to reality capture,” says Steve Perlman, founder and president of Mova, a San Francisco-based motion-capture studio that is introducing the new Contour Reality Capture System.

Contour employs two separate-yet-synchronized camera systems to simultaneously record visual and geometric information of the subject. These two sets of data are combined to result in a high-resolution 3-D digital image. With this innovative, markerless, optics-based process, every subtle detail of a human performance—from an arching eyebrow to widening eyes to a sly smile—is recorded in real time, offering directors and producers a level of creative control that has never existed before. In essence, Contour ties together the traditional world of cinematography with digital computer animation, expanding the possibilities for both motion picture and video game makers.

“Contour’s promise is enormous; the notion that the human face, in all its subtleties could be mapped in real time, and with such density of surface information opens up so many possibilities for both two- and three-dimensional image makers and storytellers. I can't wait to get my hands on it,” says David Fincher, acclaimed director of *Panic Room*, *Fight Club*, *The Game*, *Se7en*, *Alien*^{3} and the upcoming *Zodiac*.

Contour’s high-definition, 3-D, volumetric representation of the action can be imported, modified, manipulated or retargeted to other characters using off-the-shelf CGI animation software. Contour can quickly and easily import true human behavior in all its distinct complexity into the virtual realm and works well with both marker-based motion capture and key frame animation systems.

“Contour lets us move from conventional ‘point-of-view cinematography’ to true ‘volumetric cinematography’, where scenes are captured in the round,” Perlman notes. “Up till now, the filling in of the ‘round’—the ability to see the subject from alternate angles—has been done largely by hand. Marker-based motion capture is a great way to record the positions of points in space, but if your purpose is to capture a deformable surface, like a human face, connecting all those dots and filling in all the space between them is a very labor-intensive task.”

Traditional marker-based motion capture is used to create incredibly realistic performances for skeletal captures, but was never designed to capture the intricacies of soft tissue motion, like pursing lips or billowing fabric. Contour captures the motion of any 3-D surface, deformable or not, with sub-millimeter precision at up to 120 frames second, at a resolution of over 100,000 polygons per frame. The result is a totally real, digitized performance that requires minimal manual clean up.

“Contour is a breakthrough technology for digital effects production,” says Digital Domain Senior Vice President and Executive Producer Ed Ulbrich, whose credits include *Titanic* and *What Dreams May Come*, winners of the 1997 and 1998 Academy Awards® for Best Visual Effects. “Performances can now be captured in 3-D as they are performed, eliminating much of the post-production work required in the past. It isn’t just capturing dots in space anymore; it’s an actual live-action volumetric capture. This brings photoreal, computer-generated, human performance within reach of a wide range of feature film, video game, and advertising applications. Contour opens up a new world of creative possibilities for directors.”

“Contour promises a future of vastly improved facial animation for the video game business," says John Riccitiello, CEO of Bioware/Pandemic Studios, managing director and co-founder of Elevation Partners, and former president and COO of Electronic Arts. “The new generation of game systems is powerful enough to deliver photo-real facial animation. Contour promises to deliver this potential for the gaming industry.”

“The subtlety and detail of Contour is way beyond anything I’ve ever seen,” says Stephen Regelous, founder of Massive Software and creator of the Academy Award®-winning crowd animation software used in feature films franchises such as *The Lord of the Rings* trilogy and the recent blockbuster hit *Narnia: The Lion, the Witch and the Wardrobe.* “Contour is the most advanced technology I know of for creating photorealistic human facial animation.”

“Contour is the first system we've seen that provides such high-resolution motion data in a practical production environment, and SOFTIMAGE®|XSI® and Face Robot™ are the ideal production tools for working with Contour," says Marc Stevens, vice president and general manager of Softimage Co., a subsidiary of Avid Technology, Inc. “The high-quality motion data provided by Contour will allow Face Robot to produce facial animation with unprecedented realism. Together, our systems will enable a powerful new end-to-end facial animation pipeline for both film and game production.”

Contour's performance is enabled in part by a collaboration with graphics processing pioneer NVIDIA. "Generally, NVIDIA GPUs are used to accelerate the rendering and display of 3D scenes. However, in the Contour system, NVIDIA GPUs are being used for the first time to accelerate the capture of 3D scenes, bringing details of the real world into the digital realm with unprecedented fidelity," said Jeff Brown, general manager of professional products at NVIDIA.

Due to the enormous costs involved, most attempts to create photorealistic CG humans have been limited to big-budget films with long production schedules. In some cases, literally tens of millions of dollars are spent trying to create photoreal CG humans, using production processes that may require the director to wait weeks or months to see the results from a live shoot. Contour not only carves out a huge chunk from a photoreal production budget, but it provides the director with photoreal CG characters to review the morning after a shoot, eliminating the large time-lag penalty currently associated with "Digital Directing", all the while maintaining unprecedented image quality and realism. In fact, Contour results in such a dramatic reduction in photoreal production costs, it opens the door to using photoreal CG characters in a wide range of motion picture, video game, television and commercial productions as well as other yet to be imagined applications.

VICON is a developer of Academy Award®-winning motion capture systems and a division of OMG plc, Oxford Metrics Group. Through a collaboration between Mova and VICON, Contour's markerless capture system was designed to be used simultaneously with the VICON MX-series marker-based capture system. This makes it possible for Contour's cameras to capture high-resolution surface motion, such as facial, skin and cloth motion, while VICON's MX40 cameras capture high-precision marker motion, such as skeletal and prop motion.

"Mova and Steve Perlman, who also runs Mova's parent company Rearden LLC, have a long history of innovation in entertainment technology, and the development of Contour is no exception," said Brian Nilles, CEO, VICON US. "The innovation by the team at Mova is quickly coalescing into the most profound improvement in CG facial animation since our own MX40 camera. For CG animation that requires both the performer and CG character to be the same, the Mova Contour system should provide a clear and significant step toward the holy grail of a photorealistic final product. We are proud to be both collaborator, and integrator for Mova's work with the VICON system."

Contour is compatible with popular animation software and hardware systems, including SOFTIMAGE®|XSI®, SOFTIMAGE®|Face Robot™, Autodesk® Maya®, Autodesk MotionBuilder®, Autodesk 3ds Max®, all Vicon® software, and the VICON MX family of motion capture hardware. Contour data can also be exported as OBJ, C3D, or Autodesk Point Cache 2 files and synchronizes with SMPTE time-codes.

Contour is being demonstrated at SIGGRAPH 2006 in Boston. Mova will offer Contour Reality Capture Services to motion picture and video game makers in the 4th quarter of 2006 throughout the world.

"Vocal performances have long been embraced by animation," Perlman says. "What we're doing is making it possible for physical performances to be genuine enough to be embraced in the same way. In the parlance of computer graphics, the 'Uncanny Valley' is a perceptual zone where a computer-generated faces approach photorealism just enough to be eerie. Contour is the first technology to successfully cross the 'Uncanny Valley' and open the door to a whole new realm of creative opportunities".

About Mova

San Francisco-based Mova was founded in 2004 by Rearden Companies to provide 3-D motion capture services using their VICON MX-40 marker-based system, and has worked on such projects as the Electronic Arts titles *The Godfather* and *From Russia With Love* and Universal Vivendi's *Eragon.* Mova's sister company, Ice Blink Studios, which Perlman co-founded with Doug Chiang (production designer, *The Polar Express*), also is closely tied to mocap production, having provided visual effects and art direction for Sony Pictures' motion capture animated feature, *Monster House* and complete art and production design for Warner Bros' upcoming mocap feature *Beowulf*.

About Steve Perlman and Rearden Companies

Steve Perlman is an entrepreneur, inventor, founder and CEO of San Francisco-based Rearden Companies, an incubator of fundamental technologies and artistic endeavors, founded in 2000. The chief architect behind the Contour system, Perlman is the holder of over 65 patents pertaining to multimedia and communications technologies and gained initial notice as a key researcher at Apple Computer. There he led the company's multimedia initiatives in the late 1980s, including the development of QuickTime technology. He is perhaps best known for the 1995 founding of WebTV Networks, acquired by Microsoft in 1997.

Mova Contour patents pending.

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