

## NVIDIA Helps ILM Forge Epic Battle Scenes Harnessing the Four Ancient Elements for "The Last Airbender"

**Giant Fireballs, Swirling Clouds, Dust Storms Simulated 10-15 Times Faster Using Groundbreaking NVIDIA Quadro GPU Technology**

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[Official 'The Last Airbender' website](#)

[Paramount Pictures Online Press Site \(Registration page for press to obtain clips, additional images\)](#)

### [NVIDIA Quadro Case Study: ILM & 'The Last Airbender'](#)

SANTA CLARA, CA -- (Marketwire) -- 07/14/2010 -- Paramount Pictures' latest film, "The Last Airbender," features extraordinary battle visual effects created by Industrial Light & Magic (ILM), with the help of [NVIDIA Quadro professional graphics technology](#). NVIDIA announced today.

The film, released in theaters on July 2, features dramatic sequences in which characters are empowered to harness the four ancient elements -- fire, air, water and earth -- and manipulate them as weapons in battle. Giant fireballs, tendrils of water, walls of earth and overwhelming air blasts are a few of the digital simulations created by ILM as part of the film's 485 visual-effects shots resulting in over an hour of screen time.

Central to achieving many of these sequences was the use of a tool created by ILM called Plume. Plume is both a fluid simulation system and a GPU-based renderer that utilizes the [NVIDIA@CUDA™](#) parallel computing architecture. ILM realized dramatic speed increases with Plume by running simulation renders on a 12-machine GPU-based render farm powered by [NVIDIA Quadro® FX 5800 professional graphics solutions](#).

"As with everything in high-end visual effects, iteration was essential," said Olivier Maury, research and development engineer, ILM. "By working within an NVIDIA GPU-based framework, we saw up to eight iterations each day of complex fire, dust and air simulations. That represents speed improvements of 10-15x over CPU-based simulations. Access to CUDA and NVIDIA GPUs has entirely changed the way we approach a variety of complex visual effects challenges."

While Plume was initially designed for rendering computer-generated fire, its flexibility led it to also be employed in the creation of air-bending dynamics, ocean mist, smoke and the swirling of clouds. A particularly complex shot depicts the film's main character, Aang (played by actor Noah Ringer) fighting off hurled streams of fire with gusts of air that push aside the fire and sand particles. It was made possible by two Quadro GPU-driven Plume simulations of carefully directed air streams and fire, interacting with each other.

"Because Plume is accelerated by NVIDIA Quadro GPUs, it's highly interactive and becomes a tool that relies more on the artist's eye rather than their technical knowledge," explained Craig Hammack, associate visual effects supervisor, ILM. "This means you don't have to understand the underlying algorithms or all of the fine details of how fluid solvers work to drive the detail of a simulation."

ILM's primary toolset on "The Last Airbender" included [NVIDIA subsidiary mental image's mental ray® software](#) and Pixar's Renderman for rendering, Autodesk Maya for animation, The Foundry's Nuke for compositing, and proprietary tools Zeno and Saber for CG and effects creation. ILM plans to incorporate additional NVIDIA CUDA architecture-based tools into future project pipelines and continues to explore even more new ways to implement GPU-accelerated rendering into

its visual effects workflows.

#### About NVIDIA

NVIDIA (NASDAQ: NVDA) awakened the world to the power of computer graphics when it invented the GPU in 1999. Since then, it has consistently set new standards in visual computing with breathtaking, interactive graphics available on devices ranging from tablets and portable media players to notebooks and workstations. NVIDIA's expertise in programmable GPUs has led to breakthroughs in parallel processing which make supercomputing inexpensive and widely accessible. The company holds more than 1,100 U.S. patents, including ones covering designs and insights which are fundamental to modern computing. For more information, see [www.nvidia.com](http://www.nvidia.com).

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