



eyeon Software at a Glance

eyeon Software develops applications for the VFX and postproduction communities, with Fusion™, an award-winning compositing application that has been used on thousands of features and projects since 1988.

Fusion artists have contributed significant work to many box office and television successes, such as:

9	G.I. Joe	Iron Man	The Avenger
300	Gnomeo & Juliet	Journey To The Center	The Da Vinci Code
2012	Happy Feet	of the Earth 3D	The Imaginarium of Dr. Parnassus
Anonymous	Harry Potter and the	King Kong	The Last Mimzy
Avatar	Order of the Phoenix	Lost	The Tree of Life
Breaking Bad	Hugo	New Moon	Titanic
Chronicles of Narnia	Hunger Games	Prince of Persia	Twilight
Clash Of The Titans	Hunger Games Catching Fire	Sin City	Unknown
Alice in Wonderland	Ice Age	Spiderman 3	White House Down
Game of Thrones	Independence Day	Sucker Punch	X-Men
Ghost Rider	I Robot	The Amazing Spiderman	And thousands more



eyeon Software at a Glance

For 25 years, eyeon's technology has provided facilities with an advanced, fully-interconnected toolset that allows work to be completed within one pipeline.

Our vision is to offer ultimate speed and flexibility. With eyeon's GPU-accelerated architecture with CUDA/OpenCL performance maximization, facilities experience extremely fast turnarounds.

Developers and product engineers invent advanced tools with eyeon technologies.

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The Product Line Defined

**WORKING CLOSELY WITH REAL WORLD
PROJECTS TO REFINE OUR PRODUCTS.**

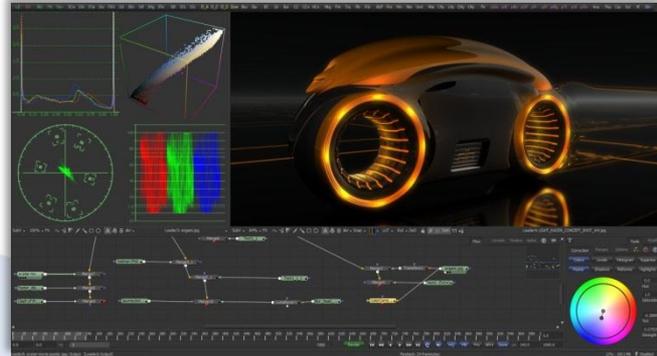


AND DEFINE A NEW BREED OF VISUAL EFFECTS.



The Product Line Defined – Fusion for Effects

Fusion has long been the compositor of choice for companies working with both demanding schedules and dynamic content. With a genuine understanding of complex production requirements, Fusion's development of comprehensive features speed up effects creation and the finishing process, truly making Fusion an industry powerhouse.





The Product Line Defined – Dimension for Stereoscopic

eyeon Dimension is eyeon Software's latest product developed to solve intricate stereoscopic production issues. Dimension is comprised of a truly advanced optical flow-based toolset that offers facilities the ability to achieve essential image estimation techniques quickly and cost effectively, while delivering near automated freedom of the stereo challenges





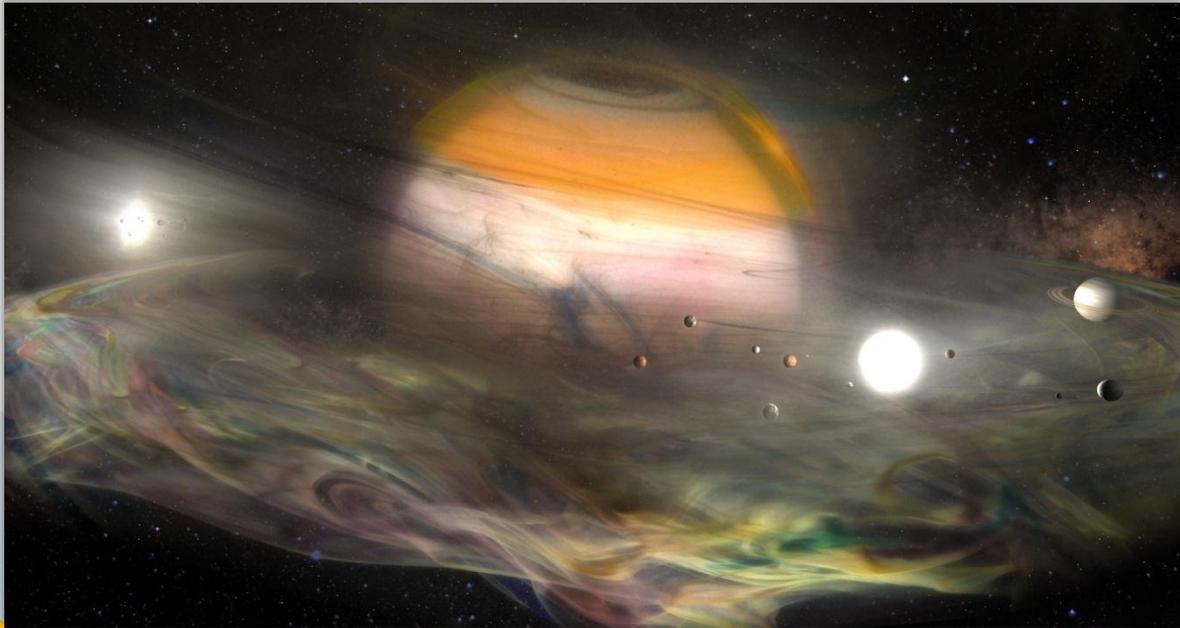
The Product Line Defined – Generation for Asset Management

Generation AM is the hottest new Asset Management Desktop. Designed to make the studio workflow really flow. Studios, artists, and supervisors need a clear and concise view of their projects, and the status of many elements and shots. Generation AM provides a visual canvas and collaborative platform for managing postproduction pipelines.



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Douglas Trumbull's HFR Project - UFOTOG





HFR Solutions For Douglas Trumbull

We have been working with Douglas Trumbull to fine-tune our HFR technologies and production pipeline tools.

- We are the first to complete 120fps dual projector playback.
- Setting the standard for future productions.
- eyeon is co-producer of UFOTOG.





HFR Solutions For Douglas Trumbull

Today, we are going to discuss eyeon's technological advances since we implemented a full GPU Supercomputing environment.

- The future of high-end computing is GPU-based.
- The design of the GPU's inner processing has been evolving to be more general, meaning that not just 3D graphics via OpenGL or DirectX can be processed, but general algorithms can be implemented.





HFR Solutions For Douglas Trumbull

- The development of CUDA cores, many of them within the GPU, means that highly parallel computing can take place.
- For eyeon Software's products, interactive performance is everything.
- Studios need to be able to make creative decisions quickly and the GPU is key in this role.

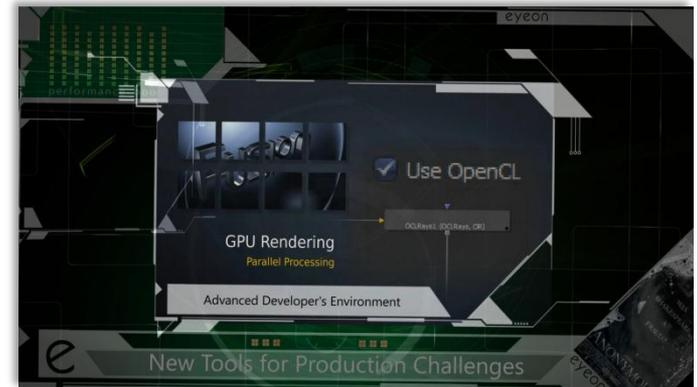




HFR Solutions For Douglas Trumbull

We utilize a number of NVIDIA technology backbones:

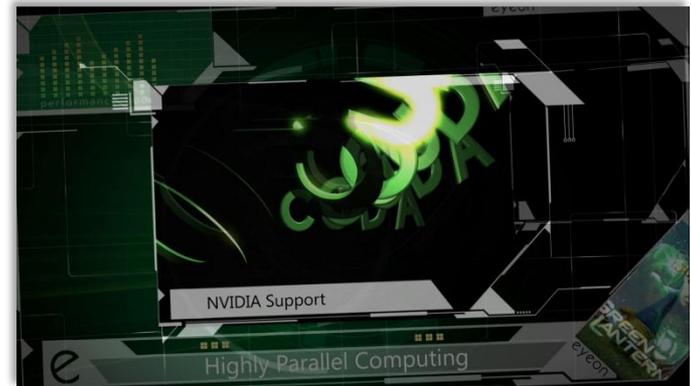
- OpenGL - to run our 3D interface and rendering pipeline, as well as our 2D viewing system.
- 3D Vision - the ability to view 3D stereo content, integrated within our products and supporting a number of monitors and projectors, and the ability to review High Frame Rate playback.





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- CG Shading Language - we have built a full 3D HDRI final renderer using CG shaders.
- CUDA and OpenCL Processing - which is used to do computationally expensive processing for various tools, such as Volumetric rendering.
- HFR Playback - films have been traditionally 24fps since the 1920's. HFR has been used in Special Venue setups for a number of years, such as Douglas Trumbull's Showscan.





HFR Solutions For Douglas Trumbull

- With films now breaking the 24fps barrier for general cinema, and all of the digital projectors installed already, there is the infrastructure to deliver HFR content to a large audience.
- For the visual effects and post production industries, this change has impact on their production pipelines, infrastructure, and computing needs.





HFR Solutions For Douglas Trumbull

- More data, more storage, more rendering, more data to track, more frames to be worked on, all push the heavy lifting of production to higher measures.
- The VFX industry keeps having to rising to the challenge of these technological gauntlets.
- Stereoscopic production, for example, doubled the number of frames however this did not double the work. It is work squared (x^2).





HFR Solutions For Douglas Trumbull

- There are many issues with stereo; color differences between left and right, miss alignment, convergence and eye separation, polarization issues from mirror rigs, twice the rendering, twice the rotoscoping mattes, etc.
- All of which have to be corrected.
- Quick fixes on a standard 2D film cannot be used in 3D.





HFR Solutions For Douglas Trumbull

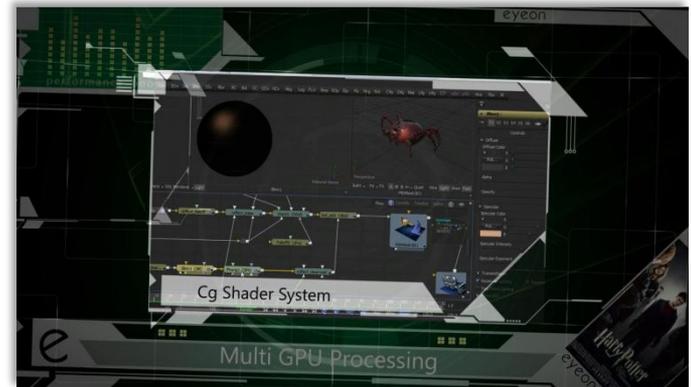
- You cannot touch up paint on one frame differently to the other eye, for example.
- With the move to HFR, and also HFR and Stereo, all of the infrastructure needs doubling again. This leads to a better way of working, hence our focus on GPU processing.
- The revolution is not in large server farms, it is in the desktop experience for movie makers and the VFX studios.





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- Utilizing multiple GPUs in workstations, allows to reduce the need and expense of large scale infrastructure.
- An artist can create, review and play back in stereo, using NVIDIA gear.
- This is all without having to cue up in a render farm.
- Interactivity is the key to creative workflow.





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Let's look at a real example of this processing efficiency:

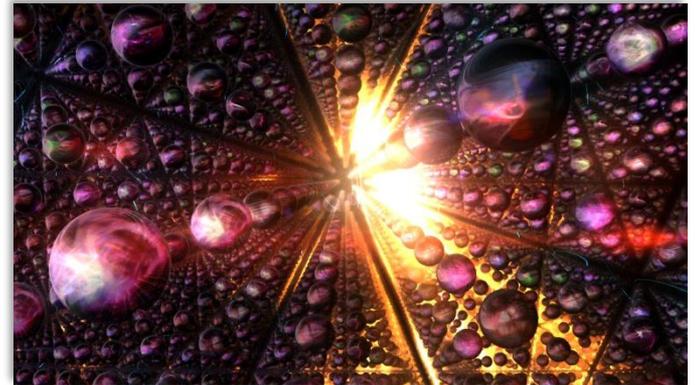
- 4 years ago if you needed to create volumetric fog and clouds, it would have taken an hour per frame to render using a 3D renderer.
- On the film “Anonymous”, we developed our first volumetric system. This did not have lighting, but it brought the Rendering time from 1 frame per hour to about 10fps.
- This was a massive efficiency shift.





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- Today we have developed this into a GPU volumetric system with full ray casting and lighting models, with self shadowing clouds, etc.
- Now this process on the GPU is 12 frames a second, so a thousand times faster than 3D rendering.
- Which, thanks to NVIDIA, is a significant milestone.



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- Motion Blur: This is one area we bring focus to because currently in the 24fps world, it is a pain to deal with and separate in Live actions shots.
- This can be one area where High Frame Rate helps.





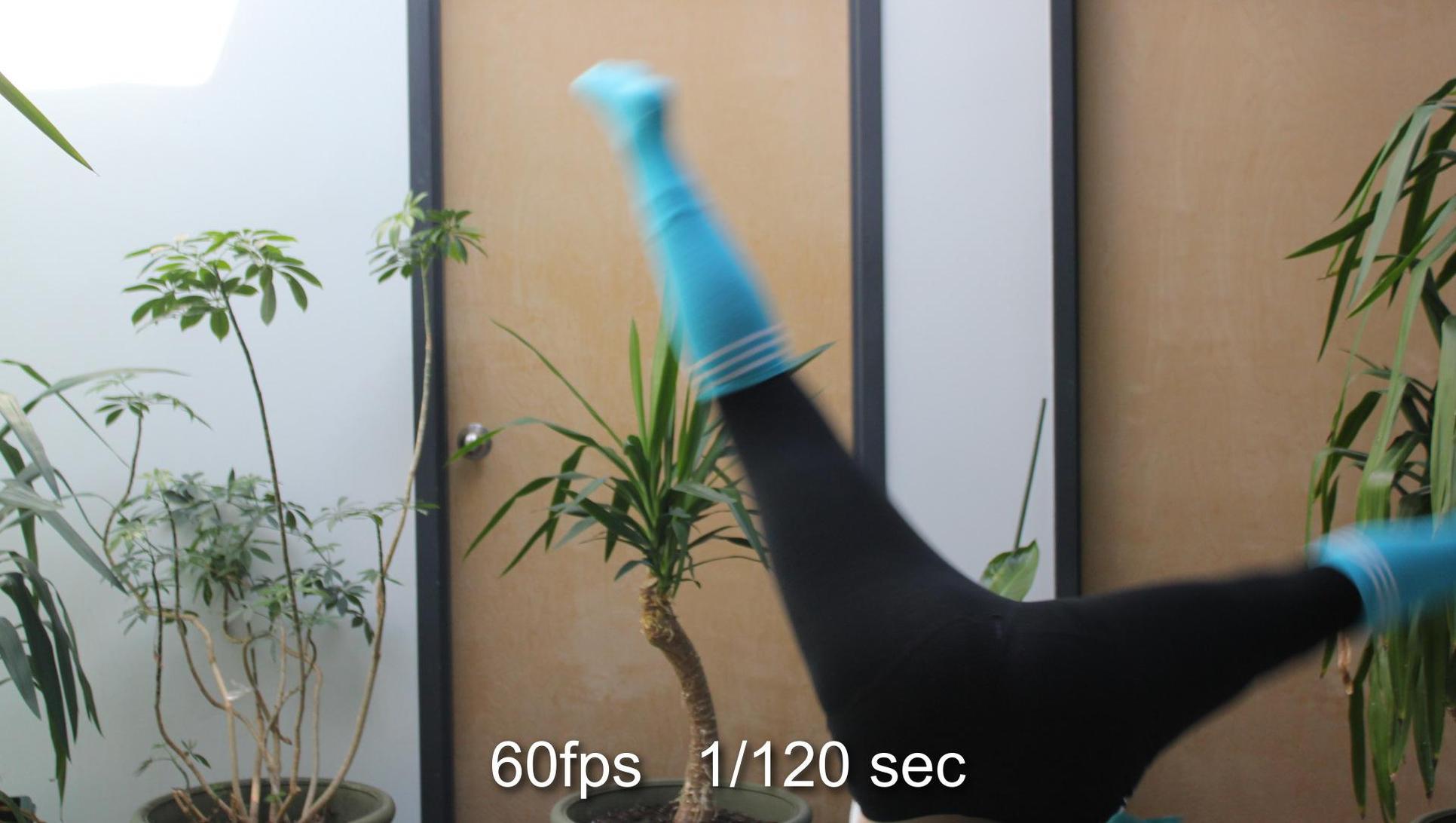
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- The examples here demonstrate Motion Blur at 24fps, the shutter angle is 180 degrees, giving an exposure time of 1/50th sec.
- To composite images underneath the Motion Blur, you have to remove the background from the blur.
- This cannot be done easily and therefore the image has to be reconstructed.



24fps 1/50 sec

A photograph showing a person's legs from the knees down, wearing black leggings and bright blue socks. The legs are raised and bent at the knees, with the feet pointing upwards and outwards. The background consists of a light-colored wooden door with a silver handle, flanked by vertical panels of frosted glass. Several indoor plants are visible, including a tall, thin plant with small green leaves on the left and a plant with long, narrow green leaves in the center. The lighting is bright and even.

60fps 1/120 sec

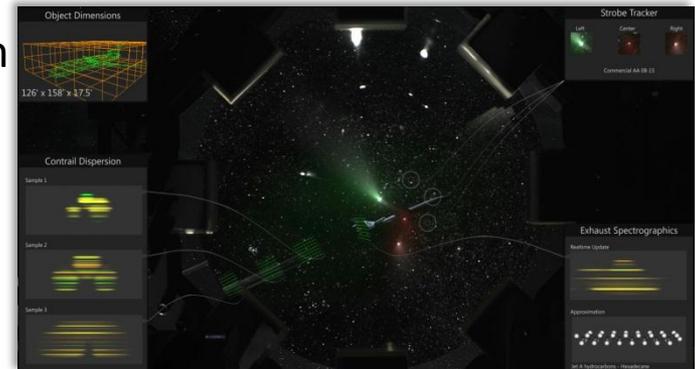


120fps 1/250 sec



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- When the shutter speed is set to 1/250 sec, Motion Blur is really minimized, therefore no reconstruction of the image is needed.
- To do roto, it is easy to find the edges.
- Utilizing Optical flow technology to add Motion Blur back in works well since the sharpness of the 1/250 second shutter makes the Optical flow accurate.





60fps 1/120 sec



120fps 1/250 sec



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Q&A

