VFXTalk Meets The Guardian of The Waves

The VFX Master Series has brought us some answers from some of the industrys' finest, the top of the league so to speak. We have had chance to sit down with these guys and get the answers to your questions. This interview is a perfect example of the industry's finest coming to us. Mark Stasiuk of Fusion CI Studios was good enough to pay us a visit here and answer your questions online about his work on The Guardian. So here it is, quite simply your questions, his answers...enjoy!

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About The Guardian
After losing his crew in a fatal crash, a legendary Rescue Swimmer is sent to teach others. He throws himself into teaching, but turns the program upside down with his unorthodox training methods until once again one of his own needs rescuing.

About Mark Stasiuk
Mark is a leading expert in RealFlow simulation software. His career in fluid dynamics spans nearly 20 years, ranging from research on nuclear core meltdown to foam stability to the dynamics of volcanic eruptions. Mark now creates outstanding fluid fx for film and commercials through expert application of 3D, RealFlow 4 and custom Python scripting. He broke new ground in fluid fx on commercial spots (Miller Beer, Listerine) and in feature films like Poseidon (Warner Bros) and The Guardian (Touchstone), where he developed entirely new algorithms for achieving photo-real, large scale fluid flow phenomena.

So let's have a look at what Mark had to say...

What kind of facilities were used to render these fluid simulations?

MS: The sim results were rendered in both 32- and 64-bit Lightwave. We used Lightwave 9 mostly.

I would like to know how much of your effects are achievable through RealFlow straight out of the box? What type of effects specifically require custom programming to achieve?

MS: Numerous of the effects are possible directly, especially for things like water flowing around under the influence of gravity, hitting and interacting with objects. We used out-of-the box tools for a variety of wave-crashing and splashing elements (altho, experience and eye do a lot to get the right look). For these kinds of effects, there are 3 areas that relied on scripting -- only 1 of which demanded advanced-type scripting I'd say:

(1) optimization/stability -- altho the fx can be done out of the box, to make them run faster or more stably, a few simple scripts to remove problematic particles or get past instability issues can mean the difference, over the course of a production, of delivering on time or not.

(2) "post-process" scripts that do things like adding spray and mist that emits from simulated water. These are crucial to the final look of realism. But they aren't particularly complex to build, at least simple versions aren't. The original version I built was while working with CIS Hollywood for a big flood shot on Poseidon, and it was pretty simple. It got improved a lot for The Guardian.

(3) Custom emission scripts, that generate fluid particles realistically off scene geometry for things like boat wakes. These aren't so easy to build.

I would like to know how long it took to render the CG scenes and if you use a built in rendering engine, or used third party. Also, what sort of render farm did you use and the specs?

MS: Well of course the render time varied tremendously with the shot. Some shots involved massive numbers of particles or polys and complex lighting, and took hours per frame. The pipeline we developed at Flash Film Works allowed us to render the fluid elements in their own layers, which was most efficient. Dan Novy, the technical supervisor, and Jen Hachigian, an expert lightwave user, worked hard on the render pipeline and did some custom things to accelerate the renders; they did some fabulous work in getting beautiful results from realflow results out of lightwave. This kept turnaround times on renders to usually within a day. Renders were done using Lightwave, as I said in an above post; RealFlow does no rendering (just openGL previews). Yes some of the simulation times were significant, but we were able to keep most to within a timeframe of a couple days.

How happy are you with the results, are they as photo real as you had expected them to be? Did you run in to major problems and if so how did you get round them? What makes RealFlow your choice and how easy is it to work with/develop?

MS: I was very happy, given the tight timeframe we had to work with. Part of the challenge of this show was the number of fluid elements needed within the time of a few months. Of course, in the final version there's always things you'd like to have improved, but it's important to keep real. In addition, it didn't always turn out the way I initially envisioned. For various of the effects, we had good reference clips but in the end those looks weren't what the director wanted because they tended to obscure everything in the shot. Instead the fluids group at Flash and the vfx sup William Mesa worked closely with the director (Andrew Davis) through a variety of versions, toning down certain "real" aspects of the fx to get a good balance. The cool thing was that we were able to control the fluids well enough to reach that happy balance.

We absolutely did hit problems but nothing was really major. Initially we were concerned because of the high particle and poly counts for the fluid elements, but Newtek helped out really quickly by getting us a beta of 64-bit lightwave, so that barrier disappeared before it became serious.

I choose realflow because it is the fastest, most stable, most flexible fluids tool around. Yes you can do certain things beautifully in maya fluids, but typically real production shots need a lot more flexibility and tailor-making than is easy with other tools. Realflow is very intuitive to do most things, it's like a little laboratory in your computer where you set up tanks and forces and let'er rip. Custom development is far easier than you might think, I learned to do a lot of cool stuff with Python in Realflow in a really short time.

Did you use geometry for small ripple-like effects or are they preocedurally shaded?

MS: The ocean surfaces were created as deforming geometry in Lightwave by some brilliant artists at Flash Film Works, using an ingenious system that I can't discuss in any detail. It also involved surface texturing. The methods produced lovely results but couldn't easily handle deformations from interactions with objects like boats, nor generation of whitecaps + mist, or breaking waves. That's where the RealFlow work came in.

How did you handle large scenes? lots of bin-loaders?

MS: In a few, we broke out the fluid elements into separate sims, but generally we did not. In large scenes, say for whitecaps on a broad ocean surface, we created fluid particles via scripts and all particles resided in a single emitter. Separate passes (and separate emitters) of course for different effects, like spray and mist.

Did you use any other non-RF technologies and for what effects did you find them useful?

MS: Flash Film Works did a variety of effects using Lightwave particles, wherever they could get a good result. Usually this was for mist and fog where interaction with scene objects wasn't needed.

Was there a good deal of compositing of CG fluids along with live action fluids?

MS: Yes, a lot. Flash Film Works has a big library of practical elements and a very talented group of compositors. The CG fluids were generally added to fit with the particular story-related needs of a shot.

How did you create foam effects? I remember with RF 3 there was some talk of using pressure to map UVs - did you do something similar?

MS: Foam-type effects were handled in a variety of ways, from compositing real elements, to hand-painting textures, to fluid particle sims on surfaces. We didn't use the technique you mentioned but I have used something similar for other work.

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What couldn't be done in CG and had to be shot?

MS: Interactions with actors and stuff crazily close to camera. Given the production schedule, the sim and render times and the extra involved CG (digital doubles) made the simulation route out of the question.

On behalf of all VFXTalkers, thank you very much Mark for coming to our site and answering our questions...Keep up the great work!

Written by VFXTalk