

FOUR BROTHERS

Digital Demolition

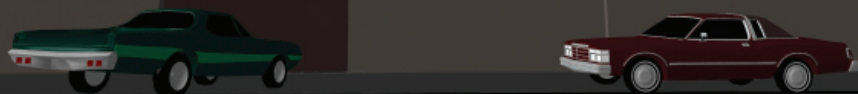
Director John Singleton knows a thing or two about car chases after making *2 Fast 2 Furious*, and he had a heart-stopping sequence in mind for his Paramount Pictures release, *Four Brothers*. In a pivotal 3 1/2 minute scene, the character played by Mark Wahlberg takes his brothers—and the audience—on a white-knuckle car chase in a raging blizzard. While the stunt driving was real, a complete flip of an El Camino sedan was not: That was one of the challenges for the CG artists at Mr. X Visual Effects in Toronto.

Visual Effects Supervisor Dennis Berardi explains, “We had to create an all-CG car that would cut directly with the

lenses, explains Berardi. “Our previz was photographically accurate within about 5 percent,” he says. “We could give them information on how fast cameras were moving—literally in miles per hour. We were able to give them camera heights as well, and tell the cinematographer and the stunt

Ellen Hoff by **Ellen Wolff**

ONE



Mr. X Visual Effects created a flat-shaded previz in *Alias Maya* and edited it in *Apple Final Cut*, choreographing the chase scene in real-world terms.

TWO



real car. This is Super 35, and the car is big in the frame.” Fortunately, Mr. X was hired during the first week of prep, and Berardi’s team could be involved in location scouting. “We took measurements and photos of the roads and built a previsualization based on the real location,” says Berardi. “We identified the blocking of the cars with the stunt coordinator to determine which cars would have to be CG and which were real, and also how to shoot them. Storyboards don’t really represent perspective very well, and it’s hard using storyboards to approximate camera movements. But previz allows you to do that.”

Working in *Alias Maya* on Linux-based PCs, Mr. X created a flat-shaded previz of the entire sequence and edited it—with audio effects—in *Apple’s Final Cut*. The cars were modeled using manufacturer specifications, and the lensing reflected what DP Peter Menzies Jr. intended to use for the shoot. Mr. X has an inventory of virtual lenses to match photographic

coordinator if the camera needed to be 2ft. off of the front right fender. We could speak in real-world units.”

Through this detailed previz, says Berardi, “We determined early on to shoot a lot of this sequence with a flying cam—a 6ft.-long helicopter with a gyro-stabilized head on the end. That was the only thing that we could use to get close to the cars at the right speed.”

The previz enabled Singleton to refine the chase’s choreography well ahead of filming. “We spent about two months developing the sequence with him,” says Berardi. “We tweaked it until he was comfortable. He told us over and over again, ‘Shoot the previz, and I’ll be happy.’ We did shoot that, and he had an assembly of the sequence in a day and a half.”

While modeling and animating the virtual El Camino, Mr. X worked with copious references. The show had the luxury of having five El Caminos, so Berardi’s team had

flipped one and photographed it from the proper camera perspective to see what debris would fly off. This real-world information enabled them to animate the car's demolition in a believable way.

A major challenge to getting a realistic-looking wreck was the texturing. Berardi had a detailed photo survey of the car—about 400 high-res photos. They also had High Dynamic Range images of the environment for reflections on the car's surface. This texture library provided a wealth of information to the studio's shader writers, who worked in Pixar's RenderMan. A 3D paint package from Right Hemisphere called Deep Paint 3D also was used for some of the texture work.

Rendering was a complex process, with 17 layers required to render out pieces of the car. "The headlights were three layers by themselves," Berardi says. While the car was rendered in RenderMan, the

complex snow elements were not. These elements, which were animated in Maya, were rendered in Maya as well.

Berardi says, "One of the biggest challenges involved generating interactive elements to seam up the virtual car with the real street. We generated a particle system in Maya that as the car hit the snow, a spray shot out. All the interactive debris that the car dragged across the street was laid in as a composite element." Completing the shot were some 2D touches, including skid marks painted with Adobe Photoshop and composited into the plate with Apple's Shake.

Throughout the process, Mr. X communicated with Singleton via a web-based shot delivery system. The studio's custom database software permitted Singleton and his editor to click on shot details and send comments immediately. Berardi observes that such a tool is essential for a Toronto-based house that wants to work on Hollywood features. "But even if we were located in L.A., our approach would be the same," he says.



The virtual El Camino was shaded with Pixar's RenderMan and Right Hemisphere's Deep Paint 3D.



Final composite, complete with CG snow.

C R E D I T R O L L

Director - John Singleton
 DP - Peter Menzies Jr.
 Second Unit Director - Doug Coleman
For Mr. X Visual Effects:
 Visual Effects Supervisor - Dennis Berardi
 Senior Technical Supervisor - Colin Withers
 CG Supervisor - Sean Cohen
 Composer - Kristy Blackwell
 Rotoscope Artist - Annu Gulati
 Rigging and Animation - Brian Anderson
 Texture Artist - Hoa Tran
 Particle Systems and Debris - Shane Glading
 Animation - Matt Ralph
 VFX Production Manager - Sarah McMurdo

Another tool that helped Mr. X deliver such a lengthy sequence in its entirety was Nucoda's Data Conform, which was used to build a 2K conform of the sequence. "It's basically a disk-based digital conform system that plays back 2K data in film color space—with a proper film look-up table which is calibrated to whatever film recorder you want to calibrate it to. As the previz got approved, it went into the Nucoda Data Conform, and as we shot stuff and got feedback from editorial, we would lay the plates in at high res. We built the sequence layer by layer. We have a 9ft. screen at Mr. X where we played the sequence digitally at 2K for the director's approval. He didn't have to wait to have it filmed out."

Best of all for Berardi, the finished sequence closely resembled what had been envisioned when the shot was planned. "It was a live-action version of the previz, which was really cool," he says. **mm**