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Dust to Glory redefines desktop HD editing

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SANTA MONICA, CA — Dust to Glory filmmaker Dana Brown's (*Step into Liquid*) feature-length documentary on the 36th Annual Tecate SCORE Baja 1000 desert race has helped to bring Adobe's Premiere Pro and After Effects tools across the "finishing line," into the age of digital cinema.

Consulting editor Jacob Rosenberg has blazed a new post trail, challenging the traditional paradigm of Avid offline EDLs and pioneering an online system that uses Premiere Pro, After Effects, CineForm's Prospect HD, Synthetic Aperture's Color Finesse, and Boxx and AJA technology to create a high definition desktop digital intermediate of the 90-minute movie.

It was a sunny day in February 2003 when Brown, producer Scott Waugh and motorcycle racer Mike "Mouse" McCoy were having lunch in Santa Barbara. McCoy enthusiastically suggested that Brown's next film should be about the Baja 1000 off-road race. Brown's mind was still thinking about Step into Liquid but recalls, "My dad, Bruce Brown, had filmed the race for Wide World of Sports in 1968." Eventually Brown took up the idea, and in June '03 he and his production team checked out the smaller race, the Baja. 500. They liked what they saw and started fundraising and pre-production for a November shoot of the 1000.

"Mouse McCoy and I could ride bikes before we could walk," says director of photography Kevin Ward, who commanded a crew of over 70.


Consulting editor Jacob Rosenberg set up an online system at LaserPacific.

In November 2003, when the green flag dropped, Ward's desert SWAT team sprung into action. There were three helicopter units; two with Arri III 35mm cameras and one with a Sony HD F900 mounted in a gyrostabilizer head. Throughout the course there were 13 ground units, each comprised of an operator, an AC and a driver/loader. Disbursed among these guerrilla units were nine Arri SR3 Super 16s (for slow motion 150fps) — four of them with night scopes — two 16mm Bolex cameras (for timelapse), one Gzap 16mm camera, one Photosonics 1VN Super 16 camera, five Sony HD F900s (three of those with night scopes), 15 Panasonic AG-DVX100 24p cameras, eight Sony XCD "cigar" cams, and eight Toshiba three-chip IK-TU51 "ice-cube" cams. Ultimately, over 55 cameras were used to capture the 32-hour race.

Ward's team shot Kodak Eastman EXR 50D 5245/7245 in daylight and Kodak Vision 200T 5274/7274 for low light, open shade and for over cranking up to 150fps. He also shot some Vision 250D 5246/7246 with the night-vision cameras, and Vision2 500T 5218/7218 at night. "And we pushed it two stops," says Ward.

When the race ended and the fiesta was over, Waugh and Brown retreated to their Santa Monica homes, opened a window for some sea breeze, and started the marathon offline edit by digitizing nearly 250 hours of footage. Brown was editing on his Avid Film Composer and Waugh on an Avid Xpress DV. They had Brown's notes and a 12-page outline to work from. When they needed a break from a sequence, they'd swap project files and talk on the phone. Storylines emerged that they didn't expect. By June 2004, after editing for four months, their first cut ran two hours and ten minutes.

Meanwhile, at NAB 2004, Josh Kline, CEO of Sample Digital, and a partner of McCoy's, approached Adobe Systems marketing director David Trescott about supporting the final conform of *Dust to Glory* in HD. This was an opportunity for the new, re-built-from-scratch Adobe Premiere Pro to finish a feature film and create a digital intermediate.

Trescott called Rosenberg, a nine-year Premiere expert, and asked if the application could be used to finish *Dust to Glory*. Rosenberg's critical question: what was their final output? Waugh and Brown said they wanted to make an HD digital intermediate that was going to a 35mm film out. "That told me," says Rosenberg, "because they wanted to edit in HD and finish in HD, that it was possible."

Using Adobe Premiere Pro to finish Dust to Glory allowed the filmmakers to make changes to the final HD master up until the last minute.

What intrigued Waugh and Brown about using the Adobe system was not that it would save them a pile of cash, which it did, but that they would have the creative freedom to make changes to the online HD final master literally 'til the last minute. "On *Step into Liquid*, we locked picture and did a linear online build," recalls Waugh. "To go and punch in and make new edits was a pain in the ass and super costly. On *Dust to Glory* we were still tweaking past the final mix."

Originally, Rosenberg reasoned they could capture and online edit in full uncompressed HD and layback to D-5 for color correcting. However, at NAB 2004 and during Adobe and Microsoft's Desktop HD tour, he became intrigued with CineForm's Prospect HD, a new codec that promised "visually lossless" compression technology in HD 1920 x 1080 10-bit 4:2:2.

CineForm's chief technology officer David Newman says that the wavelet compression used in CineForm's products is superior to other kinds of compression because even at higher compression rates and over multiple generations, there is virtually no artifacting.

Rosenberg started wondering if the workflow could be built using Premiere and Prospect HD as the final output to film. So he set up an online system in an edit room at post facility LaserPacific and built a test reel. He encoded ten different clips that reflected a good variety of the shots in the film and did three color correction passes on each shot: one very dramatic, one very flat, and "one being what we desired as being the color-corrected result," he notes.

On August 25, 2004, Rosenberg first saw the film test projected. In that instant he knew how to finish *Dust to Glory*.

Dust to Glory was color corrected in Adobe After Effects with Synthetic Aperture's Color Finesse, a 32-bit, floating-point color correction plug-in.

According to Rosenberg the advantages of using CineForm were numerous. The source footage takes one-seventh the disc space versus uncompressed. Rosenberg was able to run three, sometimes four streams in realtime with titles, transitions and no rendering. The entire 90-minute movie rendered down in full HD took up about 100GBs.

Yet even with this powerful desktop workflow, Rosenberg says that the relationship with LaserPacific was very synergistic. "They had a post house in a box," says LaserPacific executive VP Leon Silverman. But being at Laser was important for support services like telecine and output to film, and the brain trust of highly-experienced people working in HD. "The post house can be the greatest source of information how to not get into trouble," Silverman says wryly. "Making all things come together in the end."

Rosenberg's online hardware system consisted of a custom-built workstation by Boxx Technologies running the AJA Xena HD card with single link SDI input/output, dual AMD Opteron 244 1.8GHz chips and 1.5TB of RAID 5 storage.

Dust to Glory represents a true desktop digital intermediate, says Todd Bryant, chief technology officer of Boxx, eliminating the need for offline editing and suitable for both independent features and broadcast HD episodic work.

The next time he does a show with Brown and Waugh, says Rosenberg, he'll digitize all of their HD footage and telecine directly into the system from day one. "That bypasses all tape costs and maximizes the bit rate for everything. With two terabytes, we can have 60 to 70 hours of HD content on a single PC."

Inside the Boxx, the AJA Xena HD card is architectural twin of the AJA Kona card. The difference, says AJA engineer Bill Bowen, is that the Kona card has been optimized for Apple's QuickTime and the Xena card has been optimized for Microsoft's DirectShow.

Rosenberg had various categories of footage to digitize into the Boxx: film, HD, HDCAM, DV, Hi-8, even some historic VHS footage. All the DV, Hi-8 and VHS was up-rezed to HDCAM using LaserPacific's Teranex format conversion box.

The 35mm and Super 16mm footage was transferred from LaserPacific's Spirit DataCine to a QuVis/QuBit box. Silverman says that internal tests at LaserPacific show that scanning film to the QuVis/QuBit has a better signal-to-noise ratio than even D-5. All the HDCAM and HD footage then went directly into the Boxx system via SDI.

After four weeks, Rosenberg had his first conformed online edit. During the process, he was frequently on the phone, talking with Adobe and CineForm about software tweaks to optimize the system. The four upgrades that CineForm went though, says Newman, made it a much more robust piece of software.

In January 2003, Synthetic Aperture released Color Finesse, the first 32-bit, floating point color corrector that worked as a plug-in to After Effects. When *Dust to Glory* was ready for color grading, Rosenberg set up a duplicate Boxx workstation, fed the After Effects output to a studio high definition monitor, and the normally costly color correction process had a viable desktop solution.

Digital Film Tree colorist Henry Santos spent two months color correcting *Dust to Glory*, one of them with the DP, Ward.

So, how does it compare to a da Vinci? "Honestly, it's pretty good," he says. "It has curves that allow you to manipulate shadows. They have secondary extra channels, which is what a da Vinci does." It's not realtime, but still, he says, "it was pretty kick-ass."

In November 2004, after 10 weeks of online post, *Dust to Glory* went to a final film out at LaserPacific on an Arrilaser film recorder. Using very special color management techniques, different from current DI processes, LaserPacific's Doug Jaqua took the HD images and mapped them to the film.

On December 9th, *Dust to Glory* had its first screening for an enthusiastic cast and crew at the Laemmle Theater in Santa Monica. The film will be shown at the Santa Barbara Film Festival in February and will see theatrical release in April.

"The old version of Premiere had a reputation that it wasn't ready for primetime," says Ron D. Nydam, senior product manager for Adobe Premiere Pro. "This [film] validates the fact that Premiere Pro is as capable as any application on the market for getting serious high-end work done."

"*Dust to Glory* proves that a compressed digital immediate can be used in the post production workflow with zero impact to the final film out quality," says David Taylor, CEO of CineForm. By using the Prospect HD digital intermediate, he says, you can "reduce the cost of both independent and studio film productions."