Blood in the Corridor: The Digital Mastery of Hero Run Shoot-outs in *Kick-Ass* and *Wanted*

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Abstract: This paper examines the significance of the digital aesthetic of violence in the uniquely contemporary action film "hero run" shootout sequences. By using the case studies of *Kick-Ass* (2010) and *Wanted* (2008), the article focuses on how the peculiar stylistic tendencies of these sequences display a link between the onscreen, digital-enabled mastery of the shooter with the offscreen digital mastery of the visual effects artist.

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> The bright red blood wasn't a problem for everyone. Jean-Luc Godard used a bright, unnaturalistic red for movies like *Pierrot Le Fou* (1965). This suited Godard's more abstract, self-conscious approach to the movies. When *Cahiers du cinema* pointed out, "There's a good deal of blood in *Pierrot*," Godard shot back: "Not blood, red." (Wickman)

Introduction: The Art of Chaos

The way we talk about violent content, critically and commercially, is often driven by how gun violence, and the inevitable blood letting it causes, is created and depicted on screen. Once the practical province of blank firing weapons, squibs, and remote-controlled detonators planted inside actors' clothing, cinematic gun violence and simulated bullets hits and blood bursts are now often created and/or augmented with digital visual effects (VFX). At the very least since Edwin S. Porter's cowboy fired at the camera in the final frame of *The Great Train Robbery* (1903), gun violence has been an essential component of cinema's formal structure (Prince *Classical Film Violence*). Evolving technologies increase stylistic and tonal options for filmmakers, thereby necessitating a different theoretical conversation. With this in mind, we examine the aesthetic of an emerging trend in violent shoot-outs: sequences featuring prolonged gunplay and physical action in which a solo shooter on foot kills a great number of antagonists while moving quickly and effortlessly through a confined location. We see this type of set-piece in many recent action films, including *Hitman* (Dir. Xavier Gens, 2007), *Shoot 'Em Up* (Dir. Michael Davis, 2007), *Kick-Ass* (Dir. Matthew Vaughn, 2010), *Wanted* (Dir. Timur Bekmambetov, 2008), *Resident Evil: Retribution* (Dir. Paul W.S. Anderson, 2012), *John Wick* (Dir. Chad Stahelski, 2014), and *Kingsman: The Secret Service* (Dir. Matthew Vaughn, 2014). These sequences are a distinctly contemporary phenomenon, qualitatively different to the traditional heroic killing sequences found in classic Western gunfights such as *High Noon* (Dir. Fred Zinnemann, 1952) and *The Good, the Bad, and the Ugly* (Dir., Sergio Leone, 1966) or later (still analog) gun battles in films like *Rambo: First Blood Part II* (Dir.

George P. Cosmatos, 1985), *The Untouchables* (Dir. Brian De Palma, 1987), *Die Hard* (Dir. John McTiernan, 1988), *Desperado* (Dir. Robert Rodriguez, 1995) and *Heat* (Dir. Michael Mann, 1995) which typically disperse their gunplay across moments broken up by reaction shots, non-shooting segues and pauses for dialogue. The mastery of space, time, and weaponry—in the forceful trajectory of what we call the "hero run" (HR) central to these scenes—is uniquely enabled by digital cinema technology and marks a formal transformation from earlier film practices.

Muzzle-flashes, squibs, and the often unpredictable splatter of fake blood by simulated bullet hits were once solely a component of the *mise-en-scene* of cinema. The action spectacle was based on the profilmic event which existed in front of the camera, one which could cause unpredictable aesthetic results. For instance, the flash of a gun barrel could occasionally be invisible on-screen if it happened to occur while the camera shutter was closed for 1/24th of a second; but now the shape, size, color, and other properties of a digitally composited muzzle flash are entirely within the control of the visual effects artist. However, while many practical effects workers were concerned that CGI would displace the work of squibs and blood, it has since become evident that the implementation of digital effects in movie violence is much more complex than simply digital/not-digital (*Kick Ass - Special Effects*). The layering of live-action footage of performers, practical blood splats and muzzle-flashes filmed against green-screen backgrounds, as well as computer-generated particle animation, has become a commonplace visual effects process in the creation of violent scenes. Significantly this means that the aesthetic depiction of these elements in the shot can be precisely controlled or, in visual effects supervisor Janek Sirrs' terms, "art directed" (Failes). Blood, as well as explosive debris in this way, is rendered as a painterly and deliberate signifier of digital animation, even as the action protagonist (and the filmmaker) is similarly freed to move unfettered by reality. Thus, the controlled chaos of blood and the destruction of the diegetic environment in contemporary action is increasingly a function of post-production, itself an associative demonstration of mastery.

The present analysis is grounded in sequences from two recent films which visually foreground digitally augmented violence as hyper-stylized spectacle. Matthew Vaughn's *Kick-Ass* (2010) and Timur Bekmambetov's *Wanted* (2008) are each based on comics and graphic novels by author Mark Millar[1] and both offer clear examples of a number of key elements of the normative style of the typical HR sequence. Our discussion draws its methodology from the film poetics of David Bordwell ("Aesthetics in Action"; *Poetics*) and Stephen Prince's stylistic analyses of violence (*Classical Film Violence*) and the perceptual realism associated with digital visual effects (*Digital Visual Effects*). Such an analysis of these hyper-violent sequences demonstrates a significant relationship between onscreen blood and the institutional innovation of contemporary production practices. First, we show that there is an identifiable aesthetic to these sequences and second, we argue that these specific stylistic techniques can be attributed to the particular capacities of digital filmmaking practices and, finally, that these techniques—most specifically rendered as blood and gunplay effects—display significant breaks and continuities with traditional violent cinema traditions and video game aesthetics.

The careful choreography of these HR passages (notably in corridors and one-room locations) owes its spatial compression and its aesthetic of digital violence to several influences across genre and medium. First, there is the influence of Hong Kong action cinema of the 1980s-90s (particularly the films of John Woo) whose impact on subsequent Hollywood productions included prolonged gunfights, confined fields of battle, and graphic blood-work in films such as *Reservoir Dogs* (Dir. Quentin Tarantino, 1992) and *The Matrix* (Dir. The Wachowskis, 1999) (the latter film is in many ways an ur-text for the contemporary HR sequence, presenting two shooters (Neo and Trinity), in the bloodless, destruction-heavy lobby shootout). Second, there is the prevalence of digital technologies in production and post-production practices associated with contemporary visual effects. And third, videogames and graphic novels contextualize our current convergent mediascape through expectations of forward momentum and innovative weapon-play through violent scenarios.

For Bordwell, a poetics of cinema is not about generating interpretations which explicate what movies mean but rather it examines the "constructive process" that brought particular films into being (*Poetics* 19). Beyond his first and second domains (thematics and large-scale form, respectively), our particular interest lies in the third domain of poetics, which involves the audio-visual stylistic system of a film. Here, we apply this focus to the specific aesthetic (and, by association, technological) stylistic/digital devices employed in a particular type of action sequence in which the filmmakers have made choices based on their objectives of expression. From this perspective we address how the HR sequences of contemporary action cinema hinge entirely upon the aesthetic afforded by digital visual effects and post-production practices. Following Bordwell's notion of stylistic "norms" (*Poetics*), it is apparent that the HR sequence generally features the following tendencies:

1. The hero single-handedly assaults a series of enemies in a confined location;

2. The hero has a constant forward rushing movement and momentum;

3. The hero run is usually quite short – whereas traditional heroic moments (eg: John Rambo, John McClane) tend to be protracted sequences with numerous pauses in the action;

4. There is constant innovation in gunplay and killing techniques;

5. The hero tends to have extremely good accuracy with virtually every bullet hitting the target;

6. There are moments of the sequence which draw attention to the filmmaking process (highlighting the extra-textual mastery of innovative techniques)

7. The gun-play itself is enabled in some way by the digital visual effects technology available.

In this paper we analyze two illustrative examples of these tendencies in the digitally-enabled HR sequences from *Kick-Ass* and *Wanted*. We have uploaded a compilation video of relevant film clips to illustrate the points made in this analysis. The relevant video time-codes are included in parentheses during the discussion. The video can be found at the following link: https://vimeo.com/172856937.

Kick-Ass and Wanted: How the Heroes Run

Kick-Ass, directed by Matthew Vaughn (*Layer Cake*, 2004; *Stardust*, 2007; *X-Men: First Class*, 2011) chronicles the adventures of an ordinary high school student, Dave Lizewski (Aaron Johnson), who dons a green scuba suit and hits the streets as his DIY superhero alter-ego, Kick-Ass. In his largely ineffectual attempts to fight crime, he encounters the deadly father-daughter duo, Big Daddy (Nicolas Cage) and 11-year old Hit Girl (Chloë Grace Moretz), who mete out violence with brutal force as masked vigilantes on the trail of the city's most vicious crime syndicate, headed by Frank D'Amico (Mark Strong). The film draws the backstory of Big Daddy and Hit Girl as colorful comic book panels, while an early action sequence simulates the first-person shooter perspective of video games, as the camera (and the in-frame aesthetic) mimics Hit Girl's POV through night-vision goggles. These antecedents, along with the superhero genre itself, give rise to the characteristic excess of stylistic violence within *Kick-Ass*. After D'Amico murders her father, Hit Girl mounts an assault on his penthouse, its sleek and modern interiors of warm wood paneling and bright framed artwork in counterpoint to the phalanx of heavily-armed guards she must eliminate in order to get to him. She first kills three of his men staked out in the lobby, then emerges from the elevator into his foyer in full masked regalia—bobbed purple wig, cape, utility belt, full-body purple leather jumpsuit, plaid skirt, and heavy black boots. With Ennio Morricone's theme ("For a Few Dollars More") on the soundtrack and her two-fisted shooting, she simultaneously evokes Clint Eastwood's "Man with No Name" Western persona and the urban assassin of John Woo's Hong Kong trilogy (*A Better Tomorrow*, 1986; *The Killer*, 1989; *Hard Boiled*, 1992), as played by Chow Yun-Fat. The single-shooter choreography of this sequence, her motion through a confined location, is likewise similar to the narrow tea house aisles and hospital corridor shootouts staged by Woo in *Hard Boiled*, for example. The handling of guns and blades, and the trajectories of bullets and blood are equally made visually central in this confrontation between Hit Girl and D'Amico's guards.

However, the digital component of its aesthetic register puts the focus entirely on the solo shooter not on the men at the receiving end of her bullets and blades. This is fundamentally different from the late-1960s aesthetic of violence in, for example, Sam Peckinpah's shootout at the conclusion of *The Wild*

Bunch (1969) in which a huge number of victims die in spectacular slow-motion agony. *Kick-Ass* instead aligns with what Robert Hanke terms "the contemporary action movie's inconsequential violence and signification of death without pain" (Hanke 41). Vaughn deliberately pursues this signification through his stylistic choices, subverting generic expectations and establishing an alternative tonal affect. One device designed to deliver this tone—and its focus on the solo protagonist—is the music that characterizes the stylized spectacle of her hero run.

Vaughn shifts his musical cues from Ennio Morricone to the 1980s Joan Jett anthem, "Bad Reputation" just as Hit Girl transfers her attack mode from knives to guns. Coming off the elevator, she flings a wickedly accurate blade tethered at the end of a cable to take out three of D'Amico's men in the foyer, ending with a sharp yank that causes the last man to shoot *himself* in the head. At the sound of this gunshot, thirteen of the crime boss's henchmen quietly enter the opposite end of the corridor en masse, with guns raised. Hit Girl comes at them, moving relentlessly forward, with the two-handed shooting style made famous by John Woo decades earlier. With almost every shot a fatal head shot, Hit Girl vaults up the sides of the walls using the bookshelves as footholds, springing off of the shoulders of one man, dodging the incoming bullets of two others, reloading in mid-air, sliding on her knees cape flying, and arriving alive at the far end of the corridor (video timecode: 00:10:20 – 00:10:27). Performed by 13 year old Moretz, this stunt would not have been possible in the pre-digital era. The acrobatics and sheer physicality of "this Terminator-style little thing" (Vaughn 2010) utilized wire work and slow-motion airborne digital cartridges and bullets as well as the resulting blood splatter (Figure 1). As in *The Matrix* lobby hero run, this is an example of how in the era of digital visual effects, stunt-wires can be used to fly actors across a live-action set and are then removed digitally later using rotoscoping and digital painting (Seymour). Such comic book inspired violence in this scene very overtly foregrounds its digital visual effects muzzle flashes, wounds and blood spurts with the effect of distancing the violence from the much more indexically realistic blood of on-set practical squib explosives. Similar source material grounds our second example.

[Insert Figure 1 about here, photofest file: WGC001748046.tif]

Wanted, directed by Russian-born Timur Bekmambetov (*Night Watch*, 2004; *Day Watch*, 2006; *Abraham Lincoln: Vampire Hunter*, 2012) was, like *Kick-Ass*, also inspired by a Mark Millar-penned comic/graphic novel series. A terminally anxious Chicago office worker, Wesley Gibson (James McAvoy) is recruited by a secret thousand-year old sect of assassins called the Fraternity—led by Sloan (Morgan Freeman) and his top enforcer, Fox (Angelina Jolie)—who receive their kill orders from the threads woven by the ancient Loom of Fate. They advise Wesley that his estranged father was actually one of the Fraternity's top hit men, highly skilled and recently murdered by a former member gone rogue, Cross (Thomas Kretschmann). After a brutal initiation process—not unlike a military recruit training sequence, complete with sadistic beatings and psychological manipulation—Wes is given several assignments to polish his skills before killing Cross. Along the way, he discovers that the Fraternity has lied to him and that Cross is actually his father. As with Hit Girl, revenge for a murdered father motivates his subsequent attack.

To this end, Wes storms the Fraternity's stronghold, a textile factory with the red brick architecture of a medieval castle in the industrial district of Chicago. The bravura digitization of his gravity-defying mastery of space and guns in this attack displays both purpose and effect. Bordwell makes the point that "the violence in American films 'reflects' not the taste of the mass audience but the egos of the makers, who enjoy the bravado of seeming to push the envelope" (*Poetics* 31). Although we would not agree that the taste of the mass audience is not served by such scenes, we would concur that there is an undeniable pleasure in the practices that create them. Consider, for instance, the glee with which amateur curators on YouTube assemble compilations of the best kills by Rambo, John McClane etc.[2] Arguably the thrills on the screen cannot be considered as separate from the thrills felt behind the scenes by professionals who excel at their craft, who strive for more and better (and, yes, louder and bigger) in a competitive media marketplace. The very visibility of these skillsets acts as a calling card for future visual effects employment, so the goals and objectives of these set-pieces are what Bordwell would

attribute to "the institutional dimension of practice," which forms a complex "social and economic system of production, and this involves tacit aesthetic assumptions, some division of labor, and standard ways of using technology" (*Poetics* 28). Bordwell relates these technological standards to the early and the classical eras of Hollywood, as a set of stylistic devices that evolved into cinematic conventions. However, as digital effects become more ubiquitous, constant innovation itself becomes the standard.

Wanted Special Effects Supervisor, Dominic Tuohy, remarks that "Timur's dream is that we get a chance to do sequences that haven't been done before and manipulate them so they come across really well" (Tuohy 2008). Director Bekmambetov's own visual effects company, Bazelevs, created a CG fortress that appears to sit just southeast of Chicago's Cermak Road Bridge in the master shot. The scope of the enemy's power is conveyed in this shot and frames the overwhelming firepower of Wesley's run through its central factory floor, a long narrow room with a massive plate-window at one end. This sequence was shot at 150 frames per second, according to Tuohy. Because of this speed, which plays back six times slower than normal, action events during the shoot itself had to happen very quickly so that "the time on the screen" (Tuohy 2008) would show simultaneous and overlapping explosions, gunfire, bullet hits, muzzle flashes, and many, many victims in the extreme slow motion of the finished product. Indeed, the temporal treatment of this sequence employs a digital aesthetic in a more complex, expressive fashion than Tuohy's comment suggests. Rather than continual slow-motion, Wesley's rampage is actually presented in variable speeds. For instance, the speed slows down further from the normal slow-motion right at the moment one bullet fires from Wesley's revolver. In another shot, laterally tracking sideways as Wesley runs and fires two guns at two men either side of him, the speed again slows down even further to emphasize his weapon mastery in this brief moment and also to denotatively show that he kills both antagonists.

Both examples here illustrate the usefulness of this uniquely digital control over the temporal presentation of the action: not only does this enable clear comprehension of the action for the audience (Bordwell *Narration*), but it also emphasizes occasional actions as stand-out "cool" moments.

Significantly, these changes in speed are not abrupt. The transition in and out of different playback speeds is smoothly accelerated within the same shot. As we will see later in Hit Girl's likewise "speed ramped" moments, there is a fluidity to Wesley's motion and actions, enhanced and simultaneously enabled by the agency over time wielded by the digital form. The use of slow and fast motion of course has a long cinematic heritage. In the work of a filmmaker like Martin Scorsese, argues David Cox, the use of slow-motion suggests "that the subject is able to hypnotize the viewer with his or her actions" (Cox). We would add that cutting to a separate slow-motion shot derives its impact from the fact that it is abrupt. Speed-ramping within the same shot, however, is fluid. Digital postproduction enables filmmakers to accelerate and/or decelerate the temporal presentation of the shot during the post-production process, and continually experiment with where the speed changes begin and end. Although speed-ramping was possible with special camera equipment in the pre-digital era (Wise; *Film Speed Ramps... Basics*), the level of control digital software enables was not available to filmmakers prior to the rise of digital post-production tools.

Wesley bursts through the factory window, its multiple panes shattering and digitally adhering to his face and body. Significantly, one shard of glass here spins toward the camera, emphasized by the use of slow-motion. The audience's attention is drawn to the particular shard by the photo-realistic reflection of the victim's face on its surface as it spins. This effect, created using 3D modeling and particle simulation is a pure example of the kind of self-conscious digital imprint of aesthetic control which we find in many HR sequences. In his discussion of the late 1960s violence of *Bonnie and Clyde* (Dir. Arthur Penn 1967) and *The Wild Bunch* (video timecode: 00:10:50 – 00:11:44)—both films ending with slow-motion orgies of blood and bullets—Stephen Prince argues that the films emphasize the results of bullet hits, the victims in their death agony ("Slow-Motion Violence" 185). The visual focus, in these foundational sequences of violent gunplay, tended toward the victims rather than the shooters, as the camera lingered more on Peckinpah's aging American cowboys after they took bullets. It was the impact of the bullets, the violence done to the body, that interested Peckinpah and he used temporal manipulation

to draw out these moments: "slow motion is especially powerful when it correlates with a character's loss of physical volition" (185). As the Bunch shot their way through General Mapache's (Emilio Fernandez) Mexican garrison, a reputed 10,000 explosive squibs loaded with fake blood and meat were detonated over the 12-day shoot (Luck). The central aesthetic effect of this violent sequence, besides the montage editing, was the "metaphysical paradox of the body's continued animate reactions during a moment of diminished or extinguished consciousness" (Prince "Slow-Motion Violence" 185). The Peckinpah aesthetic hinges upon abrupt cutting between normal speed shots of the perpetrator with variable slow-motion shots of the victim—filmed with up to 6 cameras, shooting from 24 to 120 frames per second (Ansen)—whereas the digital HR sequence allows smooth variable speed playback without cuts. This functions to emphasize the shooter's mastery and control.

Conversely, it was Peckinpah's goal to emphasize the victim's loss of control while, we contend, contemporary violence of the sort portrayed in the HR sequences under discussion here has varied its focus to instead aestheticize the shooter's control, his or her mastery over guns and over the space of the shootout.[3] The bullet hits are not about the wounded body underneath; rather, they are there to demonstrate the VFX mastery behind the scenes (and to thrill the spectators who applaud that mastery). This focus on the killer represents a salient difference between the digital HR sequences and the traditional shootout sequences of *Rambo*, *Die Hard* and other classic action films which tend towards much more protracted, drawn out gunplay involving stop-start character movements, tension and suspense.

However, regardless of its insistence on the enjoyment of mastery, the killer's spectacle may be more or less serious in tone. The choreography and the musical cues of *Wanted* evoke a far less playful attitude, or tone, as Wesley kills about twice the number of assailants as Hit Girl. This performance of a (super)hero run is staged with impossible eye-line targeting, as Wesley shoots laterally to each side without looking as well as by crossing his arms over his chest and shooting toward opposite sides, with his eyes trained ahead of him (Figure 2). Several times, he tosses his guns in the air and retrieves the

airborne guns of the other men in mid-flight, snatching them up and continuing to shoot while running forward. Between the first two head shots early in the sequence and a cartoonish shooting-through-the-head stunt, multiple victims simply recoil backward and fall, with no visible blood splatter and no indication of physical pain. The drama, and the spectacle, here is Wesley himself (video timecode: 00:11:49 – 00:13:22).

[Insert Figure 2 about here, photofest file: WGC001748148.tif]

Wesley's behavior here points to a significant feature of these HR sequences: the astonishing accuracy displayed by the protagonists via their mastery over weapons. Although Wesley has "superhero" skills of concentration that allow him this level of control, classical action heroes have at times been regarded as superheroes by critical literature. For instance, Douglas Kellner's analysis of Rambo suggests that the Vietnam films featuring Stallone and Chuck Norris (the latter in the *Missing in Action* series) "all follow the same formula" in their representations of "the superhuman vet" (Kellner 72). Yet, it is worth recalling that John Rambo fires multiple rounds from his M60 light machine-gun to take down a single enemy in *Rambo: First Blood Part II* and John McClane (Bruce Willis) also blasts his MP5 sub machine-gun on full-automatic firing mode in *Die Hard* against only a few enemies. By contrast, both Wesley and Hit Girl achieve accurate headshots with virtually every bullet fired, in kill ratios that would astonish the original advocate of high-volume fire, Brigadier S.L.A. Marshall (Marshall),[4] and certainly put shame to Audie Murphy's own hero run in *To Hell and Back* (Dir., Jesse Hibbs, 1955).[5]

The screen time for Wesley's HR sequence is about 1 minute and 20 seconds, and like the "run and gun" sequences in videogames such as *Wolfenstein 3d* (Apogee Software 1992) or the *Call of Duty* series (Activision 2003-2015), or the much more extended shootouts in Woo's Hong Kong action, it is built on relentless forward momentum. The heavily masculine guitar riff pounds in rhythm with the orchestra of gunfire, the staccato strings, and the crack of a sharp snare drum. Composer Danny Elfman imposes no melody line in his score for this sequence; the distorted yaw of sound effects is subjective and

exaggerated as Wesley roars his way through the corridor configuration of the factory floor. The subdued color palette (dusty tans and browns) is markedly different from the bright, clean-edged, shiny hues (orange, purple, rich wood tones) in Hit Girl's HR sequence through D'Amico's penthouse and works with the divergent musical cues to depict rage and revenge in Wesley's slow-mo massacre in contrast to the giddy girl power violence of *Kick-Ass*. This extreme slow motion effect as well as the film's (and Wesley's) attitude toward killing mark it as what we would consider a part of the "serious" subset of the hero run. Its innovations in gunplay are more graphic novel than comic book. Although these terms are often used interchangeably in critical and popular discourse, even when discussing the same film adaptation of the same source material, there is a tone embedded in public perception of their respective aesthetics. The graphic novel adaptation, one would expect, is darker, even dystopian; the comic book, lighter and more attuned to pop culture/superhero conventions. Despite these differences in tone and attitude, however, both the serious and the superhero HR sequence convey the digitally-enabled invincibility of its running hero.

Violent Poetics and Digital Intervention

While owing a significant debt to their heritage in traditional action films, these sequences are a long way from John McClane's desperate barefoot run through broken glass in the original *Die Hard*, the rescue rampage of John Rambo through the POW camp in *Rambo: First Blood Part II*, or even Inspector Tequila's 30-minute hospital shootout in *Hard Boiled*. It is in the specifically digital aspects of the contemporary HR action sequence that the critical difference lies. From the compositing of CG or stock blood and bullet hits, to the digital paint work to remove safety wires attached to the performers who climb walls and jump through the air, the integration of animation and live action propel significant innovations and inventiveness into the genre.

Arguably, many things that occur in the HR sequences discussed here straddle the line between silliness and inventiveness, but it is that very obviousness that distinguishes much of their digital art

direction (and spectatorial pleasure) from classical filmmaking aesthetics. Director Vaughn remarks on some of the comedic elements in *Kick-Ass*, for example, saying, "It's silly, but it works" (Vaughn, 2010) when Hit Girl (from offscreen) whips two digital kitchen knives across the room into the chest of one of D'Amico's men (who has just looked over at his cowering compatriots and shrugged). *Wanted* employs a different tone for some of its more extreme kills. Toward the end of his hero run, Wesley careens into the dying body of one victim, his gun puncturing the bullet hole in his eye so that the barrel protrudes from the exit wound in the victim's head (Figure 3). Wesley continues forward at speed, using the body as a human shield while firing the gun through his head at the other enemies in the room (video timecode: 00:12:55 – 00:13:07). Although it is commonplace to criticize mainstream Hollywood's lack of original ideas these sorts of sequences remind us that innovation may occur in a piecemeal fashion; sometimes at the level of narrative, sometimes at the stylistic level, and sometimes simply at the level of technology. Later, we show how such fantastical ideas have their origin in video gameplay techniques which attempt to give the player something new they have not seen before.

[Insert Figure 3 about here, photofest file: WGC001748051.tif]

The aesthetic analysis here partially revisits Bordwell's characterization of Hollywood's "loose" approach to action in the 1980s/1990s, where such films try to "produce an overwhelming but loose and sketchy impression of physical activity" ("Aesthetics in Action" 74). We question the extent to which this applies to the contemporary corridor HR action sequences found in mainstream western cinema. In these, the temporal and spatial intensity of the gunplay, bullets, CG blood splatter, and surging momentum do present the deliberate "orchestration" (in the form of art-directed choreography) that Bordwell mentions but no longer implies a "loose" or impressionistic sketch. Rather, through the embedded tripartite structure of mastery exemplified by *Kick Ass* and *Wanted*—of the shooter character, the director, and the visual effects artists—there is a laser-like focus on precision and control. This textual and extra-textual mastery is made visible in the specifically digital blood aesthetic and compositing techniques used during the post-production process.

The Blood Aesthetic

One of the central components of the digital aesthetic of these HR sequences—as well as many other shootouts in contemporary cinema and television productions—is the use of what are commonly called stock footage elements. The term describes collections of discrete images of muzzle flashes, bullet casings ejecting, blood spraying and also other destruction components including fire, explosions, smoke, and debris. These elements are either created as practical special effects filmed against clear backgrounds, or as computer generated animations. They may be purchased as stock footage; for instance, a company called VideoCopilot[6] has released a number of violence-oriented stock footage packages, *Action Movie Essentials* (2006) and *Action Essentials II* (2009), as has another company called Detonation Films (video timecode: 00:13:22 – 00:14:05). Alternatively, the approach taken by some visual effects teams, including those behind *Kick-Ass*, is to create their own original blood elements for the production.[7]

From wherever these elements are sourced, the process of layering them over each other is called compositing. While the term refers to a range of processes including matte paintings (also called glass shots) and front/rear-screen projection, the type of compositing relevant to the violent sequences we are discussing here has its history in the work performed since the 1930s with Linwood G. Dunn's techniques at RKO using the optical printer (Prince *Digital Visual Effects*). The optical printer combines multiple pieces of film to create a composite image. For example, the most common example of optical printer compositing is the "blue screen" process where a foreground element is filmed against a blue or green background which is then replaced with a new background. Successive passes through the optical printer function to progressively separate the colored background (using intermediary high contrast negative and positive copies that are called travelling mattes) and through multiple exposures create a final film composite.[8]

A simple example of compositing blood from the low-budget short film *Homecoming* (Dir., Stuart Bender, 2014) illustrates the aesthetic and how it differs from and simultaneously continues the

form, function and visual impact of traditional squib-hits (video timecode: 00:14:05 – 00:14:27). The first clip shows the original footage of an actor performing the action of being shot, without the use of any squibs or makeup effects. The second clip shows two separate CG blood elements, positioned and rotated in the compositing software to indicate both entry and exit wounds. The clip frame shows the result, with the use of two techniques of the specifically digital compositing process to blend the blood elements into the live-action material. Rotoscoping (tracing) has been used on the actor's shoulder to occlude part of the blood spurt which would not be visible from this camera angle, and also the motion of the camera has been applied to the blood layers in order to mimic the motion blur of the original footage. For comparison of these techniques with the two key HR texts, consider the compositing of blood elements in *Kick-Ass* and *Wanted*. From the perspective of perceptual realism, the compositing in *Wanted* is significantly more refined than that of *Kick-Ass*, for instance the rotoscoping behind the victim's head very clearly shows an edge at the back of the actor's head (Figure 4). Given the quality of execution of other compositing shots in *Kick-Ass*, it is possible that these traces of the post-production process are in some ways intentional. If, as Amy Leigh Rust argues, "Squibs and artificial blood distill [the] indeterminacy between reality and representation, seen and unseen, reducing fantasies of authenticity to a repeatable figure: the wound" (52) this seems a fair way to understand the obviously superimposed blood of *Kick-Ass*. These are compositing "errors" in the masking and the over-saturated red hues of the blood elements which are not color matched to the live-action background. Therefore, it is difficult to treat the wounds in *Kick-Ass* as part of the pro-filmic reality—it is not "palpable" in Rust's terms (52), and instead conveys a less serious, more cartoonish tone.

[Insert Figure 4 about here, photofest file: WGC001748047.tif]

In fact, one of the reasons this compositing of digital blood and gunfire is so common on contemporary films, regardless of whether the intention is realism or non-realism, is that the techniques save time on set. As a post-production process, it reduces the hours generally required for special effects makeup, as well as the time taken to clean blood from the set, changing the actors' clothes and simply

clearing the smoke lingering in the set from the pyrotechnic charges. For instance, when Martin

Scorsese's film *The Departed* (2007) required an elevator shootout, the visual effects supervisor Rob

Legato suggested using digital blood and bullet hits to enable the director to shoot from any angle within

the confined elevator setting (*The Basement Visual Effects*). On *Zodiac* (2007), David Fincher wanted to

quickly reset between multiple takes as well as have control over the blood for historical accuracy, and for

this he relied upon digital blood for many of its murders. For instance, the effect is used to depict blood

spray on the interior of a car when one couple are shot, and is also used for the blood wounds during the

multiple stabbings of Cecelia Shepard (*Behind the Big Screen Blog*; Bielik). The *Zodiac* example is

significant: the compositing of blood and gunfire elements can be more or less photo-realistic, depending

on the artistic motivations of the filmmakers as well as the skills of the visual effects personnel. When

internet forums fill with users lamenting the use of post-production blood, generally another commenter

will correctly point out that it is only obvious or "poor" visual effects blood that they even notice whereas

the well-executed digital work goes unnoticed (*Is It Less Expensive to Use CGI Blood?*). As filmmaker

and visual effects artist Freddie Wong argues, "the reason we think CG looks bad, is because we only see

'bad' CG. Fantastic, beautiful and wonderfully executed CG is everywhere – you just don't know it"

(Wong).

In the digital workspace of modern compositing software there are enormous opportunities for the

compositor to manipulate and adjust the various layers in ways unavailable to the traditional methods of

optical printing. This is to say nothing of the incredible increase in speed with which digital methods

work, compared with optical printing (and developing) which could take days to complete. The same

result is achievable now literally with the click of a button, even on a standard laptop computer. The result

is therefore a seamless joining of live action and CG or stock footage of blood and gun elements which

would be impossible in the pre-digital era. Thus for Prince, "Digital composites thereby achieve much

higher levels of perceptual realism than optical printing could ever attain" (*Digital Visual Effects* 5).

However, this does not mean that all instances of visual effects will achieve (or aim to achieve) greater

perceptual realism. Indeed, we would argue that it means that digital compositing enables a greater artistic range to both the visual effects and overall movie aesthetics than do traditional optical effects. This point is significant in relation to the compositing of the blood in *Kick-Ass* for instance or, as we will see later, *Resident Evil: Retribution*. There is a perceptual non-realism to such highly saturated blood, even in comparison with that found in *John Wick* (though if you know what to look for it is easy to spot the digital elements in the latter film's violent scenes). Therefore, we should consider such digital compositing of violent elements from the perspective of aesthetics rather than simply calling all instances of it cartoonish. From the view of neoformalist analysis (Thompson), like any other aesthetic choice the compositing of blood may have greater or lesser realistic motivation just as it could have more or less artistic motivation. For instance, while directors like Martin Scorsese may prefer to create films as he always has, but with greater freedom due to the faster and cheaper methods available when "augmenting things digitally" (Creative Planet Network), some films like *Kick-Ass* are clearly using digital blood and gunfire as part of their digital aesthetic. *Kick-Ass* and *Wanted* deliberately emphasize the artificial nature of their post-production blood: baring the device, in Formalist terms, or at the very least flaunting the device (Schklovski; Thompson). These creative attitudes foreground the mastery of digital technologies behind the scene in parallel to the complex skills displayed onscreen, with no aspect of the visual appearance of these sequences arbitrary or accidental. Matthew Vaughn initially expected the blood elements in *Kick-Ass* to have "a comic book feel […] as it was spurted out into the air," but upon seeing the "weird" combination of comic blood and live-action footage the decision was made to use "a hybrid of real-looking blood but the amount of blood was enhanced more than you'd normally get" (Desowitz). This level of precision conforms to Bordwell's poetics as a frame for the "*rational agent* model of creativity" [ital. orig.] in which the filmmaker "selects among constructional options or creates new choices" (*Poetics* 28) from the tools and materials available. There is within this practice, he notes, a "means-end reasoning" (28) propelled by a tradition of purposeful assemblage. This historically-contingent mode of analysis, then, helps us link the goal-oriented protagonist of classical cinema to contemporary filmmakers' command over previously unpredictable (or impossible) visual effects.

Mastery and Control: Weapons in Time and Motion

As indicated earlier, the typical HR sequence embodies a tripartite structure of mastery in which the character's motion and expertise over their weapons are orchestrated by the filmmaker and executed by the visual effects team. Each of these aspects displays a desire to innovate and to draw attention to these innovations. The manipulation of time, for example, has long been a critical part of the action tool kit and here in the contemporary HR sequence is wielded with a precise (and digitized) approach towards control and expressivity. When contemporary films such as *Kick-Ass* and *Wanted* also manipulate the temporal depiction of violence, there is a very different approach than that of previous artists such as Peckinpah. The slow motion sometimes emphasizes the victim's death but, more often in the HR sequence, temporal manipulation is used to enhance weapon handling details. For instance, it is common that when the hero runs out of ammunition their magazine change will be very often presented in speed-ramped slow motion to clearly portray their masterful control over their weapon. Often these magazine changes are also enhanced by CG. For instance, as Hit Girl simultaneously reloads both pistols while running forward, she flips two fresh magazines into the air and then swings her guns in a downward arc, precisely sliding them over the clips, an effect only made possible by digital compositing. As in Wesley's sequence, digital speed-ramping is also used here to enhance viewer comprehension of the over-the-top action. The shot begins in slow motion to present the action of Hit Girl's guns sliding over the fresh magazines, then accelerates up to normal speed as she continues to charge down the corridor. Thus the speed ramping used during Hit Girl's corridor run both fetishizes her mastery of the weapons while simultaneously embedding this action within her constant forward motion which is characteristic of the HR sequence.

In this way, the onscreen mastery of a digital weapon has a direct correlation in terms of effect to the mastery and innovation of production technologies manipulated by artists behind the scenes. Bordwell notes that it is the "purpose" or function of a scene that can point us toward the "patterns" that can help us analyze it (*Poetics* 24). The purpose of a sequence like this goes beyond the forward momentum of the

narrative or the development of a character arc, although it does do those things. What frames the poetics of the shot sequence here is that we can connect its purpose to a broader cinematic context of an aesthetic pattern. The connection between purpose and pattern, therefore, is the specifically digital practice that conveys them.

This connection is, likewise, drawn by director Paul W.S. Anderson, between the aesthetic effect of digital blood and its relationship to the compressed space of Alice's (Milla Jovovich) hero run in *Resident Evil: Retribution*. He notes a spatial pattern in the series, in which they

> spend so much time in corridors. Corridors made of metal, corridors made of this and that. […] We manufactured this one particular set out of glass. But once you start spraying the blood around, you've got red on the white floor, Milla dressed in black. (Turek 2012)

It is in this corridor that Alice, the enhanced warrior of the film and video game series (the latter developed by Capcom 1996) continues her endless battle against the undead, themselves experiments by the Umbrellas Corporation gone awry. Her passage through this white corridor scene is a little over two-and-a-half minutes during which time she wields both a chain and a gun, displaying ambidextrous mastery over both weapons. Again, the wire-enabled acrobatics and the innovative slow-motion kills of multiple assailants are accompanied by a reloading stunt that, like the HR sequences in *Kick-Ass* and *Wanted*, is rendered through digital effects. Surrounded by attackers, Alice tosses a full magazine vertically into the air as she continues to fight, while simultaneously ejecting the empty cartridge downward and then kicking it into the face of an oncoming zombie. With clear aesthetic purpose, the digital airborne magazine is filmed from overhead. We see it rotating upward toward the camera, its visual detail both realistic and spectacular in its existence outside profilmic time and space. The film manipulates time so that the magazine completes its vertical drop back into Alice's hand—once these three attackers are on the ground—where she jams it into her gun and keeps moving forward (video timecode: 00:14:27 – 00:15:20). Like Hit Girl, Alice uses her assailants' bodies to vault up and over,

firing into their heads and bodies. The blood splatter is visually foregrounded by its stark contrast with the all-white walls, floors, and ceiling of the corridor. This is particularly clear in one shot where her digital slow-motion bullet, aimed directly at the camera like the cowboy in *The Great Train Robbery*, impacts an attacker's forehead and initiates a red liquid eruption from the back of his skull. Because the *Resident Evil* movie franchise is based on a video game, the link between gaming aesthetics and cinematic visual effects—made overt in this example—demonstrates that the mastery over affective purpose and production practice is an inherent component of the recurring pattern we see in HR sequences. The poetics of cinema here are not only historical but also technological.

The Poetics of Gaming and Innovations of Violence

Certainly there is existing research which links some aspects of contemporary violent action films with the narrative aspects of video games, for instance the "Playstation paradigm" of the *Crank* (Dirs. Neveldine & Taylor, 2006) and *Crank: High Voltage* (Dirs. Neveldine & Taylor, 2009) films which enables a "reset" for Chev Chelios after his apparent death at the end of the first film (Palmer 13). However, there are also ludological links between death and killing in video games and the cinematic run and gun sequences under discussion here. First, the inexorable forward-moving design that defines many shooter games is a clear forerunner to Hit-Girl and Wesley's constant forward motion. Indeed, the forward-movement of games is embedded within the code of the software "engines" which drive the games themselves. Many engines, for instance, are designed with "visibility determination" in mind to maximize speed and efficiency by only rendering the specific game environment which the player is looking at and moving towards, clearing from memory the environment the player has already passed through (Gregory).

Second, the interactive component of violent gameplay also connects to the displays of mastery (over weapons, time, and space) which characterize the HR sequences. At the very least, since the

"fatality" feature of *Mortal Kombat* (Midway Games 1992) video games have emphasized mastery over the interface/controller as a way of interacting with innovative killing. From the perspective of our current analysis of digital violence aesthetics, the execution of *Mortal Kombat*'s fatalities is a pure display of mastery by both the player and the character. For instance, Sub-Zero's fatality move, activated when the player presses a very specific series of buttons, involves tearing his opponent's head from their body with the spinal column intact (video timecode: 00:15:20 – 00:15:38).

These kinds of controls are also present in the transtextual creation of *Stranglehold* (Midway games 2007), a videogame sequel to John Woo's film *Hard Boiled* where the player controls the character of Inspector Tequila. Besides adopting the fetishized mastery of bullet-time slow-motion for the player (first popularized in the videogame *Max Payne* (Remedy Entertainment 2001) but obviously derived from *The Matrix*), Tequila can dive onto carts and roll forward through the kill-zone, or kick tables into an upright position to take cover behind them. These details are not accidental or incidental: as with the inevitable forward-momentum of buffering the game environment in many other games, Tequila's stylish stunts here are literally written into the code of the game engine itself. Indeed, marketing material for *Stranglehold* emphasize the destructible and interactive environment—an innovation by the game designers as a clear point of difference between this game and competitor's gaming products (Computer Graphics World).

Such controls on the surface may seem quite mundane. However, one survey participant observed in Scott Lukas' research on games and guns that "By using the proper weapons at the proper time with more skill than your opponents, you succeed in your goal" (79). For Graeme Kirkpatrick one of the defining qualities of video games as distinct from earlier non-digital games such as chess is the nature of "challenge" and "progression" faced by players (59). Significantly, in many games, the concept of progression is linked to a rewards system. *Stranglehold* literalizes the value of mastery by rewarding the style of your kill, for instance by sliding down a staircase hand-rail while shooting two enemies. Rather than simply shooting non-stop and indiscriminately using what the military colloquially refers to as

"spray-and-pray" tactic (Murray 72), in many games the player is rewarded for accuracy, particularly for headshots (Whitaker and Bushman 881). Indeed, the player's self-awareness of his or her mastery is built-in to the selectable level of difficulty: generally in video games the key difference between each level of difficulty is that there are more bad guys to kill. It is therefore the championing of player mastery with weapons that is fundamental to the ludological structure of shooter video games which can be seen to inform the aesthetic approach to violence and weapon fetishization in the contemporary HR sequence.

Conclusion: Blood Red

Across practical as well as perceptual registers, the capabilities of digital technologies have shifted the depiction of violence into a composite of live-action and animation. Therefore, one of the questions we have been guided here by is what this shift means for onscreen blood, as the most visible signifier of movie violence. Viewers perceive, in a visceral way, the bodily eruption, viscosity, and flow of this cinematic substance. Critics, fans, and ratings boards frequently make the distinction between the *tone* of violence as either serious or cartoonish, so we need to ask what happens when blood itself is a literal cartoon.

Filmmakers continue to build their expressive tool kit while visual effects artists make production faster and cheaper, leading to "good" CGI that is often seamless and invisible. As Bordwell asserts, movie reality is constructed from a variety of material options based on the desired effect (*Poetics* 25) and, in the case of non-digital movie blood, there are many options. While films were still black-and-white, what little blood that was allowed by the Production Code (1930-1968) mostly appeared toward the end of the industry's self-censorship era. Chocolate syrup had the same viscosity as blood and was, for example, used by Alfred Hitchcock in *Psycho* in 1960. In the 1970s, movie makeup artist, Dick Smith, refined a recipe for movie blood that combined corn syrup, methyl paraben, food coloring, and Kodak Photo-Flo (a photographic rinsing agent) in films such as *The Godfather* (Dir. Francis Ford Coppola, 1972), *The Exorcist* (Dir. William Friedkin, 1973), and *Taxi Driver* (Dir. Martin Scorsese, 1976) because it "ran over

skin and soaked into fabric just like real blood" (Wickman). Scorsese had to de-saturate the redness of the blood in the final gun battle in *Taxi Driver* to get an R (rather than X) rating from the MPAA (Motion Picture Association of America). Other recipes make the blood edible (in case actors are required to spit it from their mouths), while an alcohol-based substance from Fleet Street Bloodworks is commercially available (Wickman). This theatrical blood product is designed to stay "moist looking" on hair or clothing, even during a long shoot, and comes in:

> 'Fresh', a vibrant natural tone and 'Dark' a deep moody blood tone that intermix to create the desired look. Fleet Street Drying Bloods allow the makeup artist to layer the bloods to get a deep sense of color and realism". (http://www.ppi.cc/fleetstreet.htm)

The degree of mastery over the specific hue and motion of liquid movie blood aims for the perception of verisimilitude in the viewer. And perhaps it really is, as Godard once claimed, all about color.

From there, we note that, "[b]ecause of MPAA rules U.S. movie trailers cannot show blood, so blood is often [digitally] colored black to gain approval" (*Filmmaker IQ*).[9] In the U.S. trailer for *Kill Bill Vol. 1* (Dir. Quentin Tarantino, 2003), for example, Uma Thurman's yellow tracksuit has large black stains on the chest and arms during her swordfight with the Crazy 88's while the international trailer shows those same splotches in a vivid red. Digital bloodwork, as a tool of control over the graphic properties of visual effects can, therefore, add as well as subtract realism from the aesthetic of action cinema. It is this presence/absence that structures spectatorial, critical, and institutional perception of the *tone* of violence in movies. We suggest that future research on movie violence continues to interrogate the implication of the digital aesthetic. The MPAA, the U.S. ratings body that represents the six major Hollywood studios, has only seriously addressed digital technologies *off* the movie screen, reinforcing the perception that the ratings board is more lenient with studio-produced violence than it is with the violent content in independent films. Jack Valenti, who instituted the ratings system (replacing the Production

Code) in 1968 and who headed the MPAA from 1966 to 2005, has described the effect of digital

technologies on cinema only in regard to industrial issues of piracy and distribution (Kam).

In the Australian context, "digital" is not addressed specifically, however the descriptors of

potential techniques which the Classification Board considers in its "impact assessment" of a violent

scene do enable some consideration of how digital compositing might be relevant to a particular film

(Australian Government). Impact here is affected by "the purpose and tone of a sequence," and might be

"higher" due to techniques including the "use of close-ups and slow motion," or is "realistic, rather than

stylised" (6-7). For instance, the highly graphic CG violence of the first *Expendables* (Dir., Sylvester

Stallone 2010) film (video timecode: 00:15:38 – 00:15:47) was rated MA15+ in Australia with the

justification that: "The impact of frenetic violence is significantly mitigated by the exaggerated action

context, rapid editing and the use of what appears to be computer-generated blood and wound detail"

(Australian Government Classification Board 2). However, this does not suggest that the nuance of digital

violence can be addressed by existing theoretical and interpretative models. In this paper we have

attempted to show the value of an analytic methodology directed at the aesthetic construction of a specific

type of film sequence, while also developing a sensitivity to the peculiarities of digital production and

post-production technologies and techniques. In the hero run sequence of contemporary action cinema

like *Kick-Ass* and *Wanted* (both rated R by the MPAA, and MA15+ by the Australian Classification

Board), digital technologies enable their protagonists to achieve the impossible in the compressed

corridors that comprise their kill zones. These sequences can be demonstrated to have emerged from a

series of contingent transnational and technological developments over the last two decades. They bring

together the action design of 1980s-90s Hong Kong cinema, the proliferation of skilled artists in post-

production visual effects, and the convergent media influence of popular shooter video games and

comics/graphic novels. As game engine codes inscribe mastery and control upon player and character

alike, so too does the digital action tool kit enable film artists to rewrite the aesthetic relationship between

realism and fantasy. Directors of classical Hollywood violence (Penn, Peckinpah, Scorsese) once

unleashed a barrage of bullets through choreography of stunt performers and cameras while blood-packed

squibs traced their spectacular trajectories. In revisiting and updating Bordwell's poetics of action films

by connecting it to the digital aesthetic in this distinctive movie trend—the hero run—we wish to likewise

slow down those fleeting moments for a longer look. Hit Girl and Wesley mount their assaults on the

fortified strips of territory where violence is ultimately rendered across a spectrum of chaotic red (whether

liquid or pixel) and where a cinematic shooter can reload as if by magic.

Notes

[1] Vaughn's film was inspired by the 2008-2010 comic book, *Kick-Ass*, by Mark Millar and John Romita Jr., while the 2003-2005 limited comic books series, *Wanted*, (by Millar and J.G. Jones) formed the basis for Bekmambetov's film adaptation.

[2] See, for example, "Die Hard Killathon!" at https://youtu.be/UJaHzHwTTZs. Another compilation, "Film Counts – Sylvester Stallone Kill Count Commentary," begins with a viewer appreciation of the fake blood in *Death Race 2000* (Dir. Bartel 1975): https://youtu.be/cDWCgHS9O5E.

[3] Of course the HR sequence is not the only type of gun violence in contemporary film. However, it is a unique aesthetic phenomenon which therefore deserves critical attention

[4] S.L.A. Marshall's conducted "after action" interviews with select groups of U.S. soldiers during World War II and claimed 15-25% of men would fire their weapon during a battle. These figures are controversial and have been contested by researchers since, some of whom argue that Marshall's methodology was not robust and therefore the figures are inaccurate, and other researchers argue that Marshall was taking "journalistic" license to exaggerate claims for the sake of making his point. His influence on military training—attempting to find ways to train soldiers to fire more often—was felt in the U.S. Army from Korea through to the post-Vietnam era. See also Chambers II; Murray; Williams.

[5] There are 22 shots clearly fired onscreen by Hit Girl, resulting in 6 head-shots, 2 body-shots, 2 deaths which result from indistinct bullet impact, and 2 assisted kills where her actions cause an enemy to accidentally shoot themselves or another enemy character. Wesley is less accurate, clearly firing 70-75 shots onscreen resulting in 26 deaths (7 head-shots, 5 body-shots, 14 deaths with indistinct bullet impact, and 1 assisted kill where he stomps on an enemy's hand and who then involuntarily pulls the trigger of his own gun). Nonetheless, as with other hero runs, the kill-to-fire-ratios of these two characters are significantly better than Rambo's M60 rampage or McClane's MP5 attack on only a few terrorist/exceptional-thieves.

[6] Videocopilot offers a number of tutorials and demonstrations of the compositing process using their stock footage of explosions, blood, muzzle-flashes etc. An example of compositing explosion elements can be found at https://www.videocopilot.net/products/action2/tutorials/compositing_breakdown/

[7] The filming process for these elements can be seen in the online video *Kick Ass - Special Effects* (2010).

[8] For a useful overview of traditional optical printing, see Stephen Prince's book *Digital Visual Effects in Cinema* (Prince 2012, 60-63). The digital method of this type of compositing developed out of the chroma-key technology first created by Ultimatte in 1976 for television broadcasts, and became commonplace as a software solution by the mid-1990s (Seymour 2005).

[9] Only red-band trailers in the U.S. can show red blood, and that these can only be shown before R and NC-17 features.

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