INTRODUCTION

Looking at various newspapers, magazines and websites over the period 2004 to the present, it becomes apparent that our understanding of the reintroduction of stereoscopy (D3D) is anything but clear. There are disagreements among accounts of D3D regarding its artistic value, and its impact on the entertainment industry and audience. Over the 2004 to the present period, the digital screen period, I have seen D3D cast as an evolutionary step for the industry: 'Why wouldn't we want this Darwinian edge in our workplaces, in our sports and entertainment, in all our peak visual experiences?' (Cameron in Cohen, 2008). I have seen it described as 'the next great revolution' of cinema (Giles & Katzenberg, 2010, p. 10) and as a facilitator of art, one that could aid the audience to enter the realm of the on-screen performer (Wenders in James, 2011, p. 22). I have also seen it described as artistically limited, with claims, such as, director, Werner Herzog's '[that] you can shoot a porno film in 3D, but you cannot film a romantic comedy in 3D' (Herzog in Wigley, 2011, p. 29). Newspaper headlines have described it as a health concern: '3D film strikes two movie-goers with bout of motion sickness' (Helliwell, 2010, p. 2).[2] As well, I have seen arguments expounding the idea that stereoscopy's reintroduction is simply evidence that the popular film industry lacks ideas. For example, popular film critic, Roger Ebert, has argued that D3D was just '[a]nother Hollywood infatuation with a technology that was already pointless when their grandfathers played with stereoscopes' (Ebert, 2010a). Elsewhere, I have seen D3D cast as a business innovation rather than an artistic innovation. Neil Shoebridge, in the *Australian Financial Review*, considers that it has the potential to stabilise the popular film industry, in particular the exhibition sector (Shoebridge, 2010, p. 41). In contrast, Mark Kermode, film critic for *The Guardian* newspaper, claims that the innovation is illustrative of the fact that stereoscopy's return is 'a con designed entirely to protect the bloated bank balances of buck-hungry Hollywood producers' (Kermode, 2010). So, what to

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[2] In the days after this headline I scoured the news for a follow-up article on the condition of the 'movie-goers' as well as any anecdotal evidence of clarifying the connection between their 'motion sickness' and the use of D3D. I found no updates.

think? Since 2004, I have witnessed each of these views, convinced of one argument before being convinced of another.

There is a need for further inquiry into D3D, its relationship to the entertainment industry, specifically film, and its significance in the digital screen period. This thesis is an attempt to better understand D3D, correct false assumptions, and clarify ideas concerning D3D adoption and integration. Its particular focus is trained on the screen technology's development; its integration into diverse approaches to film aesthetics, visual techniques and visual styles; and in relation to the major contextual factors at play during the digital screen period, 2004 to the present. The question that it explores and answers is, 'How are we to understand the significance of cinematic stereoscopy in the digital screen period?'

D3D Technology and its Relationship to Visual Technique and Visual Style

To begin answering this question one must start with a basic and agreed upon definition of what stereoscopy is: stereoscopy is fundamentally a technology. It is a technology that is used to construct two different images for the right and left eyes. When these images are fused together by the brain they make an image with more vivid spatial depth, that is, a stereoscopic image. In some cases, the stereoscopic image is produced via an analogue process, which includes two lenses positioned at slightly different angles that focus light onto a celluloid strip. This strip runs through a camera and records an optical image. In the case of a digital process, the celluloid strip is replaced with an image sensor. The sensor records the stereoscopic image in the same way as the celluloid strip but differs by converting the optical image into a digital image made up of ones and zeros. Both analogue and digital stereoscopy (that is, D3D) processes are referred to as 'natural' stereoscopy. 'Natural' exists in contrast to 'rendered' and 'converted' forms of stereoscopic image production. The latter types of stereoscopy are designed and produced by visual-effects artists, via computers and computer programs, essentially changing the two-dimensional image into a stereoscopic image. Whatever type of stereoscopy it may be, whether it is natural, rendered or converted, stereoscopy is a technology-based process which has a relationship to the production of visual techniques and styles. In other

words, stereoscopy is a way for image-makers to create forms of representation and expression.

   In this way, D3D's general aesthetic sometimes differs, albeit slightly, from non-stereoscopic, conventional aesthetic production and techniques and visual styles. Conversely, it is sometimes the same. These differences are not always obvious. Many of the visual techniques and visual styles that function in conventional production function similarly in D3D production. Most close-up shots in D3D are similar to close-up shots in conventional production; most crane shots and tilts in D3D production are the same as the crane shots and tilts in conventional production; and so on. The distinction between D3D and conventional production is not always easy to make. The integration of D3D into a production, with D3D's ability to produce extra depth, has often been cited as a reason why fast cutting in stereoscopic films is problematic. Philip Sandifer, has argued this point and so too has popular film critic, Roger Ebert (Ebert, 2010a; Sandifer, 2011, p. 73). For Sandifer and Ebert, the problem is to do with the audience's position in relation to the screen space. They argue that a fast cut scene means the audience must decipher waves of spatial information and reconfigure their relation to the screen space in short periods of time. This process is a much more acute issue in stereoscopy. For Sandifer, the consequence of this process is that 'basic conventions of continuity editing … become untenable' (p. 73). In this instance conventional techniques are said to have been altered, if unrecognisably to a cinema-going audience, by the uptake of stereoscopy. A similar conclusion can be made in regard to other techniques that similarly ask the audience to reconfigure their position in relation to the screen space. A whip pan, for instance, might easily convey a sense of urgency; however, in stereoscopy, the fast movement can cause a disruption to the viewing experience via the change in spatial context that is similar to a fast cut. As Sandifer notes, there is a discernible difference between D3D and conventional production based upon the various principles and characteristics of the screen technology. Tracking the ways that stereoscopic technology relates to the industry's conventional techniques and visual styles, and its grammar and rules, is a key element in answering the question, 'how are we to understand stereoscopy's significance in the digital period?'

Analysing D3D's relationship to conventional aesthetic characteristics provokes a series of important sub-questions. For example, 'How does stereoscopy in the digital screen period change the way that screen productions are made?' 'Is perspective, shot size or cutting rate different in D3D than in conventional productions?' Answering these sub-questions contributes to answering the broader questions about D3D's aesthetic, such as 'In what ways is it similar and different to conventional production?', and, significantly, 'How does stereoscopic screen technology relate to the production of visual technique and visual style?' As one might expect, the answers to each of these sub-questions extend beyond basic measurements of shots or cuts; the answers also depend on the array of contextual factors that exist in the digital screen period.

Factors Shaping the Relationship of D3D Technology and Visual Style

There are a number of significant contextual factors that shape the relationship between stereoscopic screen technology, and visual techniques and visual styles. They include D3D's commercial affordances across production, distribution and exhibition, particularly as a means of product differentiation; its adoption by *auteur* filmmakers who have their own history, oeuvre, and visual style; D3D's growth in various genres, such as documentary; stereoscopy's own history in the popular film industry; audience reception of D3D films; and so on. In the thesis argument, these factors shape how the screen technology is ultimately integrated into a production in a particular shot, in editing, and in a scene. As well, they illustrate some of the broader trends in film.

One of the major contextual factors is entertainment franchises – 'a perennially extensible network of content in the service of several wide-reaching culture industries' (Johnson in Staiger & Hake, 2009, p. 14). Franchise productions have come to dominate popular entertainment output, most clearly in regard to film. D3D is a notable element of this output, a logical inclusion in production when considering that the connection between franchises and D3D offers a range of technological, commercial, and aesthetic results. It reinforces the ability of franchise productions, via a clear marketable point of difference, to maximise intellectual property (IP) revenues; it helps productions to spread

stories and characters across several markets and several platforms; and it illustrates the shape, size and space of cinematic worlds. What is particularly significant about the function of D3D in franchises is the different applications that D3D has in creating marketable points of difference. This use particularly relates to the competition between one firm's production and another firm's, so that the franchise with D3D creates a significant product differentiation from its rivals. However, its use also relates to individual productions within a franchise. For these productions, D3D illustrates a type of hierarchical structure within the franchise. This hierarchy denotes a production's worth to the overall franchise, which, in most cases of this type of production differentiation, means the D3D feature film is cast above other products, such as animations, graphic novels and digital games. A consequence of this is that an aesthetic point of difference is created within the franchise. In addition to these points of difference, D3D helps to illustrate the difference between the periods of franchise production. So, in the case of franchises that bridge the period before and after stereoscopy's digital screen period introduction, such as The Walt Disney Company's *Tron* franchise, for example, the more recent production is made distinct from the older production by virtue of the differences between conventional and D3D production.

Another example of the way in which stereoscopy is used as a marketable point of difference in the digital screen period relates to *auteur* filmmakers. Several *auteurs* have now produced films in D3D. This list includes James Cameron, Baz Luhrmann, Martin Scorsese, Ang Lee, and Alfonso Caurón (another, Francis Ford Coppola, has also integrated approximately ten minutes of D3D footage into his film, *Twixt* [2011]). In each case, the screen technology is taken up by a famous artist with a proven track record and integrated into his or her distinctive approach to visual technique and visual style. This uptake elevates D3D's presence in critical estimation and appreciation. The point of difference here is two-fold: it is fostered by the fact that D3D has been used in relation to other productions and also bolstered by the marketability of the *auteur* name. In some cases, D3D's uptake by an *auteur* filmmaker has resulted in a ceremonial award which reflects critical appreciation. The 2013 and 2014 Academy Awards, for example, included Best Director awards for Lee, following

his work on the D3D film, *Life of Pi* (2013), and Caurón, for his work on the D3D film, *Gravity* (2014).

In terms of the discussion of digital screen period stereoscopy, *auteur* productions provide an important opportunity to compare and contrast the use of visual technique and visual style. For example, 'How does James Cameron's D3D film, *Avatar* (2009), compare and contrast in visual technique and visual style to his 1991 blockbuster, *Terminator 2: Judgement Day*?' Both films are science-fiction with a part of their central conceit concerning the relationship between man and machine. In the same way, 'How does Luhrmann's film, *The Great Gatsby* (2013), compare to his earlier films, such as *Australia* (2008)?' The work of *auteur* filmmakers provides an example of product differentiation as well as a chance to track visual technique and visual style across conventional and D3D productions. This analysis develops the argument about how D3D is similar to and also different from the conventional production.

In the context of entertainment franchises and *auteur* films, documentary production also illustrates a number of key points. The growth of D3D into a variety of documentary modes of production provides more detail about other contextualising factors, such as product differentiation, audience reception, government policy, and commercial affordances of D3D across production, distribution and exhibition. Of note is the fact that documentary has become an area in which filmmakers have attempted to integrate a greater range of stereoscopic technologies and develop ideas and characteristics about D3D's aesthetic in relation to documentary realism. D3D's nominal reproduction of human binocular vision offers filmmakers a way of achieving forms of enhanced realism, a creative treatment of actual reality that can be argued to correspond to both dramatic and documentary productions.

The aim for many documentaries that use D3D is to migrate the audience into a particular viewing zone and help the audience to connect with the subject matter of the film. This viewing zone offers the audience an experience that it could not have in its normal life, such as seeing the environment below the surface of Earth's prehistoric ocean in *Sea Rex: Journey to a Prehistoric World*

3D (2010); that, because of space and time, they are unlikely to access otherwise, as in the various event D3D films, including *Jonas Brothers: The 3D Concert Experience* (2009) and *Metallica: Through the Never* (2013); or that merges the audiences' space and the performers' space together so that there exists a unified film and theatre space, as in Wim Wenders's *Pina* (2011). This experience is a particular feature of advertising for stereoscopy as well as a significant feature of documentary experience.

The development of screen technologies has facilitated these and dramatic feature film attempts to expand stereoscopic aesthetics by capturing images from unique perspectives, shaping image fidelity, and recreating particular beings and environments. In the D3D documentary, *Cane Toads: The Conquest*, for example, digital camera rigs were built from scratch and also modified by the camera department in order to photograph low angle point of views and migrate the audience in to the toads' world. In *Storm Surfers 3D* the resilient GoPro 3D Hero cameras were adopted with new water-proof camera housing specifically built for the high-impact water conditions. These cameras positioned the audience on a jet-ski pulling a surfer onto a wave; on a surfer's board that is riding a giant wave; and, at other times, in the water at the moment when the surfer is being swallowed by the wave's barrel. Elsewhere, in *Glee: The Concert Movie* (2011), the documentary footage is digitally converted to match the film's D3D concert footage to achieve a consistent spatial design. In *Dinosaurs Alive!* (2007) and *Flying Monsters 3D* (2011) computer generated imagery reconstructs the appearance of the Earth's historical Triassic and Cretaceous periods and presents the height, speed and volume of each dinosaur. These examples highlight the relationship between aesthetics and technology that is taking place in the digital screen period. They also highlight the notion that the uptake of stereoscopy in documentary is analogous to earlier periods of production, when screen technology, as in the 1950s when light-weight cameras and sound equipment, gave filmmakers the opportunity to approach subjects in new and diverse ways.

Another contextualising factor that illustrates the significance of the D3D technology and its relationship to an aesthetic in the digital screen period is

stereoscopy's own periodic history. As one might expect, the themes developed over stereoscopy's history continue to have an impact on the way that it is perceived by contemporary filmmakers, audiences and critics: evolution or gimmick; economic need or aesthetic need; short-term technological adoption or long-term technological adoption; stereoscopic technology or widescreen technology. These themes continue to colour our understanding of the digital screen period. Consequently, stereoscopy and the reactions to it in the 1910s and 1920s, 1950s, and 1970s and 1980s are significant.

But, just as this historical information explains how digital screen stereoscopy reflects a continuation of particular characteristics and themes, it also illustrates how the digital screen period reflects a change from previous periods. In previous periods, for example, stereoscopy was rarely a part of franchise productions, aside from a small selection, including *Jaws* (*Jaws 3-D* [1982]) and *Amityville* (*Amityville 3-D* [1983]) franchises; it was rarely used by *auteur* filmmakers, although there are some notable exceptions [3]; few event and feature documentary stereoscopic productions were made; and there were few national cinemas outside of the USA, UK, Italy and Russia that integrated stereoscopy into production. All of this is to argue that studying D3D means also understanding the broader contextual factors that shape how cinematic stereoscopy exists, as a technology and as a visual technique and a visual style. In particular, these contextual factors simultaneously show how D3D is similar and how it is different to conventional production and to previous stereoscopic productions and periods.

Ways to Explore D3D

Continuity and change are explored in a number of ways in this thesis. They are explored, for instance, in relation to stereoscopy's transition from being an analogue technology to a digital technology; in the relationship between D3D technology and visual technique and visual style; and in regard to various contextual factors. Continuity and change act as a broad framework that helps

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[3] As Michael Kerbel (1980, p. 11) notes in the article, '3-D or not 3-D', the list of *auteurs* who have used stereoscopy in various film roles include Alfred Hitchcock, John Ford, Francis Ford Coppola, Raoul Walsh, Walt Disney, Douglas Sirk, Norman McLaren, Edwin S. Porter, Budd Boetticher, the Lumières, Abel Gance, and Chuck Jones.

to define D3D, and answer the key question of how are we to understand the significance of cinematic stereoscopy in the digital screen period.

The Australian national cinema, and its involvement in and integration of D3D into production cycles, is a key example of digital screen period stereoscopy. It is a national cinema that demonstrates how the digital screen period is different from previous stereoscopy periods, particularly in regard to the creation of new forms of cinematic expression. Australian productions illustrate D3D across dramatic and documentary, franchise entertainment, and *auteur* productions. These productions also show the effect of government incentive policies, such as the Australian Screen Production Incentive, on the rate of expansion of D3D production beyond traditional centres of D3D production, such as Hollywood. In short, the example illustrates particular artistic, financial and industrial shifts that have occurred in the digital screen period as a result of the transition from analogue to digital screen technologies.

The framework of continuity and change is explored by each of the three main branches of film studies: film history, film theory and film criticism. These branches are integrated and interwoven in the thesis in order to highlight particular characteristics of D3D. They develop the case that illustrates examples of continuity and change. In particular, the branches of film studies help to discuss technological developments, the adaptation and expansion of technique and visual style, stereoscopy's relationship to entertainment franchises and *auteur* productions, and the analysis of stereoscopy's history in the popular film industry.

Film history is particularly relevant when discussing the ways that technology adoption has occurred. It is again referenced when considering why technological innovation was attempted and how, when, and where it occurred: for instance, 'Why had stereoscopy been adopted into Hollywood during the 1910s and 1920s, 1950s and 1980s and not succeeded?' 'What factors were at stake in these periods, and are these factors similarly represented in the digital screen period?'

Film theory is also important. It helps to define and illustrate the stylistic norm of conventional production which is then used to contrast against the use of D3D. The film theories in the study similarly have roots in film history studies. David Bordwell, Janet Staiger and Kristin Thompson's (1985) historical study of classical Hollywood in *The Classical Hollywood Cinema: Film Style and Mode of Production to 1960* defines a theory for classical continuity system. This study is a core reference work. So too is Bordwell's (2006) intensified continuity theory, which he explores in *The Way Hollywood Tells It*. These theories, and others, such as Barry Salt's 'Practical Film Theory', aid in developing an understanding of the relationship between the D3D screen technology and visual technique and visual style, as well as illustrating what we can consider to be different from conventional production and the same. They help to answer such questions as, 'How is meaning shaped by D3D?' and 'What does its emphasis on depth do to the particular structures in play for continuity cinema, be it classical continuity or intensified continuity cinema?'

Film criticism illustrates individual approaches to D3D production. By using methods that are based in film criticism, for instance, individual film productions are analysed so that the key elements of their production come to light and, with them, their individual approaches to D3D production. Film criticism is particularly useful in regard to analysing franchise and *auteur* productions where specific elements of the production, distribution and exhibition context have an impact on the film's reception. Film criticism is also significant in tracing the broader issues, problems and ideas concerning the reception and perception of D3D. How, for example, do the individual elements of a filmmaker's approach to D3D change how the screen technology is received and judged as an art form?

In the context of film history, film theory and film criticism, this thesis applies qualitative methods to D3D. Scholarly accounts of D3D are centre-pieces in the thesis. These accounts are complemented by industry practitioner and popular criticism accounts of D3D. Practitioner accounts, for example, recall first-hand experiences of the ways that D3D was produced. These experiences correspond to a critical understanding of why a film, a scene's

staging, a shot or a cut appears the way that it does for pragmatic or artistic reasons, or both. They offer a logical perspective on D3D which goes toward reducing some of the hyperbole, both negative and positive, that appears innate to the debate of entertainment technologies, such as D3D. Moreover, they ground the debate in the principles of the screen technology, the craft of the filmmaking trade, and the direction that the art form is taking. Typically for practitioners, production is not so much 'movie magic', as the saying goes, but hard work and a collaborative group effort. In addition to practitioner accounts, the function of popular criticism is to further base scholarly accounts in a broader context. So, just as the practitioner accounts contextualise production practices, popular criticism illustrates factors regarding individual film reception. In addition, popular criticism helps to lead the study toward some of the significant productions that have so far been released, such as those by *auteur* filmmakers.

In combination with qualitative methods, this thesis also incorporates quantitative research methods. This type of research, which draws on the work of Barry Salt, breaks down individual films into their core elements, namely shots, edits, perspectives, camera moves and so on. The purpose of this analysis is to collect objective data on the way each film has been constructed. This method reverse engineers a production in order to find out particular elements of its construction. When multiple films have been analysed, the study has the potential to define patterns in the way that D3D is produced. These patterns support and bolster arguments in each of the three branches of film study. For example, tracking stylistic trends over time contributes to strengthening the study's claims regarding film history. Patterns in the way that a collection of films are made can be used to support theoretical observations. As well, comparing and contrasting elements of film 'A' to film 'B' can illustrate why 'A' was critically praised while 'B' was deemed to be unsuccessful. In this way it can help to explain critical reactions to D3D. More generally, the study's quantitative methods are a means to clarify whether particular assumptions regarding D3D production are correct, such as the assumption that D3D films should not include fast cutting.

When the qualitative and quantitative methods are combined, a broader foundation of study is achieved, one that draws on broader contextual factors as well as specific examples of D3D. This approach naturally includes a diverse range of perspectives. As such, the study discusses a range of views on D3D, scrutinising whether D3D is in fact an evolutionary step; a facilitator of art; a means of sector change; a concern for consumer health; and so on. In considering these views, the question about how to understand D3D's significance is opened up in relation to key factors, such as aesthetics, commerce, and industry. This analysis of D3D shows there are also many intersections with works that explore the context, development and significance of other elements of screen technology. In this way, stereoscopy, sometimes seen as a marginal or incidental form, is an example that contributes to broader arguments about screen technology and the ways that it is valued, used, exploited and shaped.

Thesis Outline: Chapter Summaries

In terms of organisation, the argument comprises four chapters. Chapter One, Literature Review and Methodology, addresses the key literature regarding screen technology, screen technology uptake by industry and practitioners, and the relationship between screen technology and visual technique and visual style. It is here that the concepts of technological innovation, adoption and integration are explained and developed in regard to the popular film industry's commercial and aesthetic needs. The literature review also defines the classical Hollywood continuity system and discusses the idea that stereoscopy is an aberrational visual style. In the final major section of Chapter One, the methodological underpinnings of the study and its methods, including an explanation of qualitative and quantitative methodology, are outlined. This outline includes a more detailed account of the thesis's application of Barry Salt's 'Practical Film Theory' to D3D analysis.

In Chapter Two, the ways that D3D corresponds to conventional production are considered, with reference to popular *auteur* filmmakers, such as James Cameron, Martin Scorsese and Ang Lee, and blockbuster franchise productions. This chapter expands the ideas and themes of Chapter One by

establishing some of the visual techniques that digital screen filmmakers and entertainment franchise productions have come to incorporate. As well, the chapter identifies a narrative form that these filmmakers and others have used in relation to D3D, one that combines narrative complexity with visual depth. *Auteur* and franchise productions have been significant in shaping the reception and perception of D3D and their respective films are used to illustrate the creative approaches to stereoscopic film production.

In Chapter Three, the analysis of D3D film production is continued in relation to significant contextual factors, such as government incentive policy. To illustrate the ways that funding influences D3D production, the focus of analysis is pulled from a broad view of popular cinematic production onto the Australian film industry and the Australian Federal Government's Australian Screen Production Incentive policy. This industry and its policy are significant for a number of reasons, not least because they illustrate the ways that stereoscopic production has increased during the digital screen period in national cinemas that had not participated in stereoscopic production in any significant way during previous boom periods. This increase means that new creative approaches to D3D are being developed in new production contexts. The case study, Baz Luhrmann's blockbuster film, *The Great Gatsby* (2013), is an example of how the Australian context has enabled Luhrmann to create his own approach to D3D. In this way, it is an example *auteur* uptake of D3D; of the ways that D3D is creatively approached in relation to literary adaptation; and the ways that D3D is being 'indigenised', or in the case of Australia, 'Australianised'. Significantly, it is also an example of the ways that digital screen filmmakers have co-opted funding policy in order to be able to produce D3D. So, just as the Australian industry has benefited from D3D production, in relation to cultural and industrial returns on its investment, filmmakers have similarly benefited by being able to express ideas using D3D.

D3D production in different contexts is further analysed in Chapter Four, which considers the uptake of the screen technology in relation to documentary production and the creative treatment of actuality. D3D has grown significantly in documentary during the digital screen period, developing most in regard to

sub-genres that are referred to in the chapter as Event, IMAX and cinematic feature documentaries. The chapter investigates the diverse approaches to D3D, in particular the integration of D3D into various documentary modes of representation. The investigation explores the way that the documentary sub-genres attempt to migrate the audience to a specific context that links the audience to the documentary subject. The Australian feature length examples, *Cane Toads: The Conquest* (2010) and *Storm Surfers 3D* (2012), are used to illustrate how digital technology developments in the screen industry have approached this form of D3D documentary experiential aesthetic and how this is a significant approach to the representation of 'the real'.

Each of these chapters contributes analysis and argument that help to answer the main question, 'How are we to understand the significance of cinematic stereoscopy in the digital screen period, 2004 to the present?'

CHAPTER ONE

LITERATURE REVIEW AND METHODOLOGY

INTRODUCTION

This chapter surveys the scholarship that relates to the study of D3D and, more specifically, to the question of the significance of stereoscopy in the digital screen period. The literature review covers a selection of scholarship from the three branches of film study: film history, film theory and film criticism. In addition to these sources, the literature review also considers practitioner accounts, and popular and industry criticism accounts of stereoscopy. These accounts are used to contextualise and support the core historical, theoretical and critical scholarship; which is to say that they expand upon and build a more cohesive argument about D3D, often being used to connect scholarly sources to the relatively small areas of D3D production, distribution and exhibition. In all, the selections of literature form a basis from which the methodology for this study is developed and from which it offers its own contribution to the field of D3D research.

Although this research focuses on D3D, it is not limited to this area. The fact that D3D has various industrial, economic and aesthetic affordances means that the survey of scholarship also draws upon sources that explain these affordances and the way that they shape D3D. In this respect, the study includes discussions of film industry business, in particular those to do with screen technologies and the ways that they have come to be adopted by the entertainment industry via economic and audience needs. It also includes discussions of film aesthetics, namely the various formal systems of technique in popular film. The connective and convergent nature of the film industry means that film industry business and aesthetic production have a considerable bearing on D3D's forms and functions in the digital screen period.

Chapter Overview

This literature review and methodology chapter develops two streams of analysis that merge. One stream traces the analysis of screen technology in the context of film history and film theory, and another stream focuses on defining the field of D3D. This approach develops ideas about the field of D3D while also looking beyond this field. When the two streams are combined a clearer understanding of D3D as well as more general principles about film form, production, distribution and exhibition is achieved. These streams come together in the methodology section of the chapter, which explains how qualitative and quantitative methods are used in the following chapters to explore and analyse the significance of digital screen period stereoscopy. Having these two streams come together to form one is apt for a study of D3D. It mimics the screen technology's technical process of creating two separate images of an object which are then merged to form a clearer and more rounded view of the object.

The analysis begins with a brief discussion of stereoscopic technology, particularly in regard to accounts of its development as a filmmaking tool. The discussion demonstrates that stereoscopy is comparable to other screen technologies, such as widescreen, colour film and synchronised sound. This argument has implications for the way that stereoscopy is analysed. In particular, it means that the analysis and discussion by film historians, film theorists, film critics regarding other screen technologies also apply to and help to explain D3D. So, for instance, Edward Buscombe's (1985, pp. 83 – 91) analysis of the adoption of colour film sheds light on the popular film industry's adoption of D3D, principally by showing the economic motivations for its adoption and subsequent failure to satisfy audience needs that are required to maintain a long-term presence. This analysis is complemented by David Bordwell, Janet Staiger and Kristin Thompson's (1985, pp. 243 – 245) discussion of technology adoption in Hollywood which, in addition to factors outlined by Buscombe, includes an emphasis on industrial efficiency imperatives of new technologies. These scholars, Buscombe and Bordwell et al., demonstrate a larger context of screen technology adoption and integration.

To illustrate these ideas, the example of stereoscopy's golden age, the 1950s boom period, is introduced. This period is a significant example in the literature, one that is shared among many scholarly, popular and industry accounts of stereoscopy. The purpose for citing it in the literature review is three-fold. It helps to illustrate particular ideas that are typically framed with reference to the 1950s period, such as Buscombe's and Bordwell et al.'s analysis of screen technology. It also introduces and expands upon ideas relating to the way that stereoscopy aesthetics are analysed and discussed, as in William Paul's (1993, pp. 321 – 355) analysis of the period's emergence aesthetic. As well, the example of the 1950s boom period provides a summary of the dominant narrative that is applied to stereoscopy, which depicts the technology rising to a peak before falling back into obscurity.

This dominant narrative – referred to as the 'canonical story' by Thomas Elsaesser (Elsaesser, 2013, p. 219) – is particularly useful in outlining some of the major themes of stereoscopy's existence in film, including visual gimmick and exploitation, problematic integration of technology, and an initial boom followed by inevitable demise. In many instances, these themes are evoked in relation to the other periods of stereoscopy as a short-handed way of explaining its introduction and integration. Initially, it was also evoked to explain the digital screen period. However, the dominant narrative explanation is not necessarily applicable to D3D. The industry has changed; the main players in the entertainment industry, for instance, have expanded into conglomerates with interests in multiple media and multiple platforms, and the threat to their business has similarly taken on a different shape than in the 1950s. Rather than a rival medium, the threat to the film industry is the internet's business model. Nevertheless, the 1950s boom period example is still useful in outlining the main themes and considerations of screen technology adoption and integration in the film industry. Moreover, it is useful in defining the various initial reactions to stereoscopy's reintroduction in the digital screen period, particularly those by popular critics.

In this vein, the chapter looks toward the characteristics of the canonical story that apply to the digital screen period and also help to make the period

distinct from the past. Here, Thomas Elsaesser's analysis of the digital screen period is used to identify several counter-narratives which scholars such as Bordwell (2006, p. 58; 2012, pp. 64 – 82), Rose Woodcock (2011), Miriam Ross (2011; 2012, pp. 381 – 397), Janet Murray (1997, pp. 44 – 49) and Henry Jenkins (2006, pp. 83 – 130) also help to explain. This includes an analysis of economic and industrial factors which have made D3D a 'killer app' for the major distribution conglomerates. In addition, it includes references to studies of D3D aesthetic factors, such as the production of images that provoke feelings in the audience of inhabitation and participation in the screen-space, and how these effects have led popular cinema franchise productions toward the creation of images and narratives that combine the depiction of depth with a depth of story world detail. In terms of the broader framework of continuity and change, these ideas and trends are cited in the literature review to make the digital screen period distinct from the past. They are largely unique to this period. However, it is worth noting that they nevertheless occur in relation to some of the main themes of previous boom periods, such as the economic motivation for stereoscopy's reintroduction and its application in the production of various forms of realism, such as seamless, psychological, and so on.

A key finding of the literature review which is detailed in the latter stages of the chapter concerns the need to reflect on D3D aesthetics. This need materialises in respect to Barry Salt's 'practical film theory' method of aesthetic analysis, which is outlined in relation to the chapter's main example, the 1950s period, and in addition to the work by Paul, Elsaesser, Bordwell, Woodcock and Ross. Salt's method is made distinct by its objective approach to aesthetic analysis. It is an approach that merges quantitative analysis with an explanation of a period's main social forces. The approach is made distinct in this thesis by extending its application to D3D production, which to my knowledge has not been attempted before in extensive comparisons. In short, this extension of Salt's quantitative approach to D3D and its use in combination with qualitative methodology is the thesis's original contribution to methodology. This contribution is significant in its broad application to screen media: it is used to illustrate dramatic feature films as well as documentary films, and has potential to illustrate other screen media content. In this instance, the intention in

applying Salt to D3D is to detail particular aesthetic qualities of the digital screen period and, more broadly, to illustrate the relationship between screen technology and visual technique and visual style.

Based upon the findings of the literature review, the chapter concludes by outlining the direction the following chapters will take in analysing D3D and in answering the main question: 'how are we to understand the significance of cinematic stereoscopy in the digital screen period?' This includes an explanation of the main objects of study, namely a large number of D3D films, and how they invite analysis of varied uses of D3D in diverse contexts. As well, the chapter outlines the intention of the thesis to study the Australian film industry's participation in D3D. It is a significant example, one that illustrates the artistic, financial and industrial shifts that have taken place as a result of the transition from analogue to digital screen technologies. For example, in Chapter Three, following a discussion of D3D in relation to popular film technique and visual style, the Australian Screen Producer Incentive policy is explored in relation to Baz Luhrmann's *The Great Gatsby*. In Chapter Four, Australian films, *Cane Toads: The Conquest* and *Storm Surfers 3D*, illustrate D3D uptake in documentary production, with particular reference to visual styles that aim to re-contextualise the audience's position in relation to the filmed image. In these instances, the Australian industry is shown to be an example of D3D that illustrates many of the ideas, problems and issues examined in the literature review to do with the transition from analogue to digital.

STEREOSCOPY AS A TECHNOLOGY

To begin, one must iterate the basic and commonly agreed upon notion of stereoscopy: stereoscopy's origins and its varied developments for cinematic representation have a basis in technology. When, for instance, Bordwell, Staiger and Thompson (1985, p. 245) discuss stereoscopy in *The Classical Hollywood Cinema: Film Style & Mode of Production to 1960*, it is in relation to stereoscopy's technological form as a vehicle for the dominant, seamless realism ideology of the classical continuity system with the creation of binocular depth. When Salt (1983, p. 316) refers to it in *Film Style and Technology: History and Analysis*, it is in the context of particular stereoscopic cameras and projectors

that fulfil aesthetic requirements. The same is true of Edward Buscombe's (1985, p. 91) argument in the essay, 'Sound and Colour', where stereoscopy is referred to as being a marketable point of difference, a celebration of screen technology which has significant economic value to a capitalist industry. It is also true of John Belton who refers to stereoscopy as a '"killer app" that would accelerate the conversion of theatres to digital projection' (2013, p. 339), and Thomas Elsaesser (2012, p. 299), who refers to it as a technology with applications in digital screen media as a phenomenological tool with commercial potential. In each case, stereoscopy is a technology, and without the technology the vivid illusion of three-dimensions on screen would not exist (Bordwell & Thompson, 2013).

Discussions of stereoscopic technology are an important feature of trade journals and industry practitioner accounts. These accounts focus on the development of particular mechanised features and their relationship to technique and craft. Arguments about stereoscopy are often constructed around the technology's development, so that the timing of the technological design brings to light its significance in regard to a particular period. [4] Some accounts even base their study around patent office applications. This is the case, for example, in *Foundations of the Stereoscopic Cinema: A Study in Depth* by Lenny Lipton (1982), and in Daniel Symmes's (1983) account of stereoscopy in the July 1983 edition of *American Cinematographer* magazine. This approach has the effect of chronologically categorising the technological development of stereoscopy and the stereoscope. The result is that stereoscopy is defined at various times as a lenticular technology (developed in 1849), an anaglyph technology (1852) and a polarised technology (1929-1932; Lipton, 1982, pp. 24 – 36); a dual (1838) and a single camera rig technology (1965; Williams, 1983, p. 38); an over-and-under (1965), a side-by-side film process technology (1971;

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[4] Examples of this type of traditional history include Hal Morgan and Daniel L. Symmes's (1982) *Amazing 3-D*; Ray Zone's (2005, pp. ix – xi) introduction to *3-D Filmmakers: Conversations with Creators of Stereoscopic Motion Pictures*; Zone's (2007; 2012) two volume account of stereoscopy in *Stereoscopic Cinema and the Origins of 3-D Film, 1838 – 1952* and its chronological cousin, *3D Revolution: The History of Modern Stereoscopic Cinema*; Rick Mitchell's (2004) essay, 'The tragedy of 3-D cinema'; and the July 1983 edition of the trade journal, *American Cinematographer*. A variation of this history is recorded in Zone's (2012, pp. ix - xxx) *3-DIY: Stereoscopic Moviemaking on an Indie Budget*, which traces the developments of amateur stereoscopic movie technology.

Case, 2007, p. 44), and a combination of electronic imaging and motion control (1990s; Mendiburu, Pupulin & Schklair, 2012, p. 29); and a film (1880), a digital cinema package (1998; Zone, 2012, pp. 258 – 263) and a Blu-ray disc storage technology (2001-2003; Brown, 2010, p. 49). Each design is highlighted in order to illustrate the various ways that technology has developed to solve particular technical problems or add particular efficiencies to production techniques.

In most of these accounts the discussion of stereoscopic technology is highlighted while the changes that the technology means to a production cycle are often understated. In other words, integrating stereoscopic technology alters conventional modes of production. Stereoscopic production, for example, typically means that camera departments enlist specialised technicians, sometimes referred to as stereographers; studios integrate stereoscopic theatres so that the heads of each department can watch the dailies; and post-production houses enlist specialist editors, conversion experts and special-effects workers to complete the cycle (Mendiburu, Pupulin & Schklair, 2012, pp. 22 – 25). The choice to integrate the stereoscopic technology means changing elements of the mode of production, a fact that is often understated in lieu of the detailed discussion of the features of the screen technology.

Stereoscopic Craft

Significantly, trade and industry discussions of stereoscopy typically offer a clear explanation of the technology. This explanation is usually accompanied by a basic summary of the fundamental characteristics of the stereoscope's design: two images with slightly different perspectives that, when combined, form a single image with more vivid spatial depth (Lipton, 1982; Hummel, 2008; Block & McNally, 2013). Often, this explanation uses the various stereoscopic production processes as being analogous to human binocular vision. In this sense, a stereoscopic camera with two image-taking lenses, or a computer program that creates slightly different images, or a cinema projector with a polarised, right- and left-eye filter fitted onto the projector lens, are referenced in relation to the right and left eyes and the brain of a human. This type of explanation is referred to by Alan D. Williams (1983, p. 13), in the July, 1983

issue of *American Cinematographer* magazine, as the 'classical definition' of stereoscopy. An example of the classical definition is the stereoscopy textbook, *3D Storytelling* (Block & McNally, 2013). Bruce Block and Philip McNally begin their account of stereoscopy by couching their discussion in regard to a common human experience. They write:

> As we look around at home, at work, while playing sports etc, we see the world in three-dimensions ... In the real world, we see objects with <u>two</u> eyes. Our eyes look at or **converge** on an object. ... Because our eyes are about 2.5 inches (63.5 mm) apart, each eye sees a slightly different view of the world. Our brain ***fuses*** these two views into a single three-dimensional image (original italics, bold and underline; Block & McNally, 2013, pp. 4 – 6).

The fused image, Block and McNally explain, is broadly representative of the stereoscopic process; thus, the often complex mechanics of stereoscopy are simplified into terms related to everyday human experiences.

Similar instances of the 'classical definition' occur in most other trade and industry practitioner accounts, including Robert Hummel's *American Cinematographer* article (2008, pp. 52 – 63); Lenny Lipton's technical account, *Foundations of the Stereoscopic Cinema*; Dave Edwardz's first-hand filmmaking account (2010, p. 22); and David S. Cohen's (2008) discussion with director James Cameron; as well in film studies accounts, such as David Bordwell's and Kristin Thompson's *Film Art: An Introduction* (2013, pp. 180 – 181). In most of these instances, the example of human binocular vision is directly linked to the two main stereoscopy controls: interaxial width (sometimes referred to as interocular) and point of zero parallax (sometimes referred to as point of convergence or intersection). Williams (1983), for example, refers to interaxial width and point of convergence directly after providing his version of the 'classical definition of 3-D', saying that each control is common to 'all 3-D systems' (p. 13). In other words, they are fundamental characteristics of stereoscopy: interaxial width and point of zero parallax distinguish the stereoscopic image from the conventional image; they are the controls that make stereoscopy unique (Cohen, 2008).

Further explanations of interaxial width and point of zero parallax in industry practitioner accounts extend the discussion into general stereoscopic principles and production techniques. In this context, interaxial width is defined as being, simply, the distance between the two image-taking lenses (Lipton, 1982, p. 60; Edwardz, 2010, p. 22). The width denotes the extent of the image's dimensionality. So, for example, a short interaxial will achieve a small three-dimensional effect, which is closer to a two-dimensional image, while a wider interaxial distance will achieve a large three-dimensional effect. The greater the width means a greater disparity between right- and left-eye images, and therefore a larger three-dimensional effect. However, as most accounts point out, more width is not always considered better, which points to technical and technique considerations, and the craft of stereoscopic production. For example, setting the correct width for a specific shot is based on a range of factors. According to *ASC Manual* editor, Robert Hummel (2008), factors affecting how a stereographer should set interaxial width include:

> The focal length of the taking lenses, the average size of the screen on which the film will be projected, continuity with the next shot in the final edit, and whether it's necessary to have a dynamic interocular that will change during the shot (p. 53).

In other words, stereoscopic production is a craft, which includes the choice of lens; whether a shot's stereoscopic effect conflicts with the next shot; whether there is a need to change the size of the stereoscopic effect during a shot to avoid conflict; as well as the relationship between the stereoscopic effect and the size of the cinema screen. The same factors also apply in computer-based converted or rendered digital stereoscopic production.

The same approach to production applies in regard to the design of the point of zero parallax. This is the point where the left and right images converge so that there is neither a positive nor negative parallax value, and is sometimes referred to as the point of convergence, particularly in classical definitions of stereoscopy.. The stereographer, Lenny Lipton (1982), explains point of convergence by extending the parameters of the 'classical definition':

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You can see the tip of your finger as one finger, but if you look behind it you change the point of convergence and your finger will look blurry or doubled. When the eyes converge on an object in space, it is seen as a single image, and all other objects, in front of or behind the point of convergence, can be seen to be double images (pp. 59 – 60).

In this sense, this characteristic of stereoscopy is related to readers as an everyday occurrence, one that helps them understand the basic details of two images coming together to form a rounded single image.. There are complications when illustrating stereoscopy in this way.For instance, in stereoscopic cinema, the point of zero parallax (point of convergence) and the point of focus are not necessarily tied together, as in human binocular vision. The benefit of this characteristic is that it allows filmmakers to distinguish depth relative to the point of zero parallax, typically positioned on the screen plane In a basic explanation, the point of zero parallax is the control that makes the stereoscopic image appear to either come out from the screen plane toward the audience (in negative z-axis depth), appear further away (in positive z-axis depth), or in some instances, such as when objects are filmed using cameras that are inwardly rotated (that is, toed-in), in both negative and positive parallax. When an object appears to come out from the point of zero parallax toward the audience, it is referred to as being in negative parallax. Conversely, when an object appears beyond the screen plane, it is referred to as being in positive parallax (Lipton, 1982, p. 60).

The significance of interaxial distance and point of zero parallax is particularly apparent during exhibition, where incorrect design results in issues concerning divergence, coupling and decoupling, hyper-convergence, window violations and retinal rivalry. These issues all have the potential to lead to eye strain and also nausea (Block & McNally, 2013, pp. 59 – 110; Case, 2007, p. 45). An example is when the interaxial distance is set too wide. In this case, the audiences' eyes are asked to perform an abnormal task and move beyond a natural distance. This task has the potential to cause fatigue, strain and nausea. The same is true for the incorrect use of the point of focus. For example, if a filmmaker consistently moves the point of focus from behind the screen plane to

in-front of the screen plane, they are asking the audience to unnaturally process focus information from one extreme to another. This constant repositioning and reorientation of the audience's spatial position relative to filmed objects has the potential to cause fatigue and eye strain; to quote Block and McNally (2013), 'the Z-axis jump will be uncomfortable as the audience shifts its point-of-attention between two subjects' (p. 93). The most common stereoscopy related eye disorders are called strabismus, which is a type of disorder concerning an unco-ordination between right and left eyes, and amblyopia, which is a sight imbalance condition. These maladies continue to be felt and reported on in newspaper headlines; for example, '3D experience makes some filmgoers ill' (*The Gisborne Herald*, 2010, p. 20), 'Movie nauseous for some' (*Otago Daily Times*, 2010, p. 2), and 'A sight for sore eyes' (Bedo, 2010, p. 9). Setting the correct interaxial width and the point of convergence is significant in avoiding these problems.

Digital Development and the Implications of Technology

The various developments of stereoscopic technology in the digital screen period are also significant. They have meant that filmmakers can make adjustments and corrections more easily in order to avoid fatigue, strain and illness during production, particularly post-production, and during exhibition. According to the industry practitioner and commentator, Dominic Case (2007), in *Australian Cinematographer* magazine, 'Digital technology is bringing new solutions to some of these considerable difficulties of creating 3D images' (p. 45):

> Computer animation allows the digital filmmaker much greater control of depth of field, point of convergence, and interocular separation than is easy on a physical shoot. Meanwhile, digital projection resolves many of the earlier problems of projector matching and alignment … (p. 45).

That is, in addition to a film's various visual effects, digital post-production pipelines enable filmmakers to reduce production and exhibition issues relating to interaxial width and point of convergence.

A similar celebration of the development of stereoscopic technologies appears in filmmaker and D3D pioneer, James Cameron's discussion of D3D in industry journal, *Variety* (Cohen, 2008). Cameron cites the digital development of stereoscopy as a key motivational element in his and, partner, Vince Pace's interest in stereoscopy. He states that:

> When I started down the path of developing the 3-D cameras with Vince Pace in 2000, we were looking for an alternative to the massive film-based cameras I'd used in the past. Two years later, while deep in stereo technology development and production, I had an epiphany: that the digital projectors being proposed to replace 35mm film could support 3-D perfectly, because of their high frame rates. They could actually display 3-D by projecting left and right eyes sequentially, at crazy high frame rates, which we perceive as simultaneous. So I figured this would mean that a whole new era of 3-D was now possible, and that our humble 3-D efforts would ride to market on the broad back of the digital cinema rollout, which was seen as imminent and inevitable (Cameron in Cohen, 2008).

In other words, the property affordances that were created when stereoscopic technology evolved from analogue to digital established stereoscopy, or rather D3D, as a viable option for the director and cinematographer team. They could achieve the look and detail of their story worlds in such a way that would not distract or cause problems for the audience. This development meant that stories that were once deemed un-filmable, such as Cameron's *Avatar*, which was originally scripted ten years before production, could now be produced (Waxman, 2007, p. 1).

Industry practitioner and chief executive of DreamWorks Animation, Jeffrey Katzenberg, offers another example of the significance of the development of stereoscopy as a digital technology. In an interview with Peter Giles for the Australian, Film, Television and Radio School journal, *Lumina*, Katzenberg told Giles (2010):

> This is not what I always refer to as my father's 3D in which you put on those horrific red and blue anaglyph glasses, where you're seeing something through two projectors trying to get synchronicity between right eye and left eye projection ... This old kind of 3D was a

gimmick, it was a trick and it was meant to try and take a B movie and offer a bell and a whistle … That's the past.

But what's changed is, one, you're now seeing 3D movies through very, very high quality glasses … [T]he second thing is digital projection … The third things are the authoring tools themselves. The authoring digital tools, now allow the storytellers, the filmmakers, to control with such precision how that 3D image is being created and most importantly, how you the audience are being brought into the story itself (pp. 10 – 11).

Here, Katzenberg, as in Case and Cameron, iterates the tacit argument found in trade and industry accounts that the development of the stereoscopic technology is an important event with wide ranging ramifications for production, distribution and exhibition phases, as well as for ancillary markets.

In many ways, these accounts of D3D technology align it with other stereoscopic technologies, such as single-camera rig or polarised glasses technologies. The consequence of this is that just as other stereoscopic technologies were considered to bring about new periods of production, so too is digital closely linked to the rise of digital screen period stereoscopy. Digital is akin to a 'silver bullet', the main event that solves many of the problems that were blocking stereoscopy's long-term mainstream use in the industry.

Perceiving D3D in this way has other important implications for the way D3D is understood. As well as being aligned with other stereoscopic technologies, it is also tacitly aligned with other, more prominent screen technologies, such as sound, colour film, widescreen. As analysis of stereoscopy can draw from accounts of these other screen technologies, such as those by Bordwell et al., Buscombe, and Salt. The appeal of these accounts is that they focus on areas of screen technology that do not directly include stereoscopy but may be cognate with it in terms of the potential to contribute to film language or visual style. So, in effect, having established that stereoscopy is a screen technology, the review of literature is implicitly enlarged to include ideas and arguments that have been used to explain corresponding screen technologies.

FACTORS THAT SHAPE SCREEN TECHNOLOGY ADOPTION

Broadening the parameters of relevant scholarship means film history approaches are applicable to the study of D3D, such as the analysis and discussion of how and why other screen technologies came to be adopted by the popular film industry; how they were received by the industry and the market; and how they were integrated into the dominant modes of production. This expansion includes the explanations by film historians to analyse and illustrate the adoption of other screen technologies, as in Buscombe's (1985, pp. 83 – 91) discussion of the differences and similarities in sound and colour adoption, and Bordwell et al.'s (1985, pp. 474 – 498) analysis of technological change in Hollywood up to 1960. These explanations, and others about screen technology adoption, represent a broader consideration of social context factors than included in trade journal and industry practitioner accounts.[5]

Technologies Must Satisfy The Industry and The Audience

An example of this different type of account is found in Brian Winston's (1998) book, *Media, Technology and Society: A History: From the Telegraph to the Internet*. For Winston, technological change and adoption represent the 'fundamental continuity' of culture (p. 2). Innovation and adoption are shaped by broader social forces, what he calls 'supervening social necessities' (1998, p. 6). The latter term refers to the characteristics of the time that are required for innovation and for the technology to transition from prototype to market. So, when the right cultural, industrial, technological and economic forces – that is, the right 'supervening social necessities' – are present they produce the right set of circumstances to motivate the transition of the technology from prototype to market (Winston, 1998, p. 6). Technological innovation and technological adoption are shaped by these particular social forces. This notion understands adoption as occurring via a process of evolution rather than, as might be

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[5] This criticism mirrors Pam Cook's and Mieke Bernink's (1999) in *The Cinema Book* of trade journal and industry practitioner accounts. Cook and Bernink point out that these types of accounts typically shy away from more complex descriptions in order to depict development as 'a combination of individual genius and aesthetic predestination' (1999, p. 45).

surmised from trade and industry practitioner accounts, revolution (Winston, 1998, p. 2).

Winston's notion of 'supervening social necessities' correlates with an argument made by Peter Wollen (in Heath & de Lauretis, 1980) which focuses more on the commercial imperative of the market to adopt a technology. Wollen argues in a similar way to Winston that:

> New technologies do not simply emerge, but by virtue of
> their development, the market promotes their use
> (sometimes to the point of insistence), creating needs
> which the new technologies serve to commercial advantage
> (Wollen in Heath & de Lauretis, 1980).

In other words, the market motivates specific needs in an industry which the adoption of technology is designed to satisfy. In most cases, these needs, which generally take the form of economic and aesthetic needs, amount to more than simple technological solutions to problems in production, distribution and exhibition; rather, screen technologies are adopted in relation to these problems but not solely because of them.

Like Winston and Wollen, Buscombe (1985) also considers the broader social forces affecting technological adoption. He does this in his essay 'Sound and Color' which analyses the adoption of colour film technology in relation to the adoption of sound technology by Hollywood (Buscombe, 1985, pp. 83 – 91). Particular attention is paid in the argument to explaining the processes of adoption, firstly, by an industry and an individual company, and, secondly, by an audience. This layered approach essentially divides the adoption process into two main parts so that the economic needs of the industry and the company are outlined before the aesthetic needs of the audience.

For instance, it is in the context of industry that technology adoption is framed in terms of the economic need of the industry. Buscombe (1985) begins his analysis by iterating a commonly held notion of Hollywood that largely frames the industry as being driven by economic factors:

> One must start with the fundamental law that in a free
> market economy a firm is motivated by, to use the terms of
> capitalist economics, a desire to maximize profits; or, in
> terms of Marxist economics, a desire to maximise the rate
> at which it extracts surplus value (pp. 85 – 86).

This explanation identifies the commercial nature of Hollywood.[6] The point of making this claim is to highlight the fact that a screen technology, such as D3D, must first satisfy a fundamental need of Hollywood in order for it to be initially considered for adoption. In short, profit largely motivates the initial adoption of technology in Hollywood.

Buscombe's argument subsequently explains the typical process of innovation for free-market companies, such as Hollywood's major studios. This process includes the adoption of technologies but is not limited to technological adoption; in fact, technological adoption, as Buscombe points out, is only attempted once other potentially easier options of achieving a profit or surplus value are exhausted (1985, p. 86). So, for example, Buscombe says that, before attempting to adopt a technology, a company can explore new markets in order to grow the size and scope of the industry and the company's share of that bigger industry (1985, p. 86). As well, a company can lower production costs in order to increase its cost-to-profit ratio. It can also increase its share of the existing market by lowering its prices and undercutting competitors (1985, p. 86). However, once these alternate options fail to achieve the goal of increased profit or value the company is then motivated to innovate and integrate new products with the view of creating a point of difference from its market competitors. It is only at this stage that the adoption process is likely to begin (1985, p. 86).

To provide more detail about the key factors that are at play for an individual company during the adoption process, Buscombe quotes from Edwin

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[6] Other examples which concern the commercial nature of Hollywood include, scholar, John Izod's (1988) analysis of Hollywood in *Hollywood and the Box Office 1895 – 1986*, who says, 'Profits have always, from the earliest days, been the primary objective of the American film industry (p. ix); and Janet Wasko (2003) in *How Hollywood Works*, who argues that, 'Above all, profit is the primary driving force and guiding principle for the industry [Hollywood]' (p. 3).

Mansfield's book, *Technological Change* (1971). One quotation that Buscombe uses, for example, states that a company should consider:

> (1) the extent of the economic advantage of the innovation over older methods or products, (2) the extent of the uncertainty associated with using the innovation when it first appears, (3) the extent of the commitment required to try out the innovation, and (4) the rate of reduction of the initial uncertainty regarding the innovation's performance (Mansfield in Buscombe, 1985, p. 84).

That is, Mansfield says that a company should consider a different business model, one that motivates the company to evaluate the key pressures of adoption regarding change, risk and expenditure. Another of Buscombe's Mansfield quotations outlines the basic ways that a company manages expectations; estimates expenditure and labour, including production costs; and forecasts the market's reception to adoption (Mansfield in Buscombe, 1985, p. 84). In effect, these pressures, and the management of pressures, correspond to Winston's notion of supervening social necessities and also to Wollen's emphasis on the commercial imperatives of the industry, although the context of Mansfield's argument is focused on an individual company rather than broader industrial contexts. In all, Mansfield argues that a company must appreciate particular contextual pressures in order to maximise profit. This process of appreciation should occur as a part of basic due diligence work. For Buscombe, Mansfield's business model is taken to represent a logical process of adoption, and is useful in outlining some of the factors influencing adoption from a company's perspective which occurs in relation to a broader industry perspective.

The references to a hypothetical company and its actions when adopting a technology lead Buscombe's argument back to Hollywood and the main examples of sound and colour. At this juncture Buscombe points out that the decision to adopt a screen technology is made relatively quickly in Hollywood. This speed is largely due to the close proximity of the major studios to one another, which has the effect of reducing profit and value outcomes in regard to exploring new markets, decreasing costs or lowering prices. For Buscombe, the structure of the industry means that when one studio attempts to exploit new

markets, lower production costs or drop consumer prices, the other studios invariably follow their lead. This reaction reduces the potential gains of the initial action, and relates to the industry's oligopoly structure and over-arching regulative policy, circa 1950 (Buscombe, 1985, p. 87). In this context, the adoption of screen technology becomes the obvious path for a studio to achieve its objective of profit or surplus value: '[f]irms continue to compete with each other, but the main form of competition takes the shape of a search for new products' (Buscombe, 1985, p. 87). Screen technology adoption performs this role, ultimately helping to shape the dynamic of the industry by strengthening the position of one company in relation to another.

Buscombe's analysis continues beyond the discussion of the economic needs of an industry and an individual company to also focus on the needs of the audience. It is here that he examines the aesthetic performance of a screen technology, in particular its integration into the dominant modes of production. A key factor regarding market adoption is that success typically means the screen technology will have a long-term presence. In summary, a screen technology achieves a sustainable commercial return on the industry's or company's technology investment by satisfying the market's needs. The market pays for continued use of the screen technology because it satisfies their aesthetic need.

For Buscombe (1985), the notion of an aesthetic need is 'ideologically determined' (p. 87). In terms of Hollywood, he says, the main ideological determinant is realism. Realism has varied, if often interrelated, meanings. Two forms of realism recur in relation to screen technologies such as stereoscopy. The first concerns a technologically enhanced sense of immediacy, where the technology corresponds to the audience's binocular perception of reality, including the spatial characteristics of binocular vision. That is, the screen technology – or, perhaps, the combination of screen technologies – has the potential to create an image that the audience feels they can simply reach out to and touch the projected objects (Allison et al., 2013, pp. 155 – 156). The second is a seamless representation of reality. This is a form of realism that corresponds to the classical Hollywood cinema mode of production which strives 'to conceal

its artifice through techniques of continuity and "invisible" storytelling' (Bordwell et al., 1985, p. 3). The techniques of classical Hollywood films, such as shot composition, continuity editing, staging, props, and so on, create the illusion of spatiotemporal coherence and narrative flow so that the audience is provoked into overlooking the means by which the illusion of space, time and narrative logic are constructed and imbued with meaning. These forms of realism link to further nuances of the term. This includes psychological realism, where images correspond to a character's state of mind or their perception of reality; and forms of documentary realism which provides a creative treatment of actuality. Whatever the form of realism, the adopted screen technology needs to strengthen realism in order for the technology to satisfy the market's need.

The screen technology's relationship to realism and the audience, however, is complex. For instance, even though a screen technology appears to complement the production of an enhanced sense of immediacy, the audience may still reject the technology based upon notions of how reality should be reproduced. Buscombe (1985, p. 88) makes this point by referring to Hollywood's adoption of colour, which was initially met with criticism, despite human eye sensitivity to the colour spectrum. The general reaction from industry commentators, he says, was that colour 'did not connote reality but the opposite' (Buscombe, 1985, p. 88). Given this reaction, his conclusion is that screen technology adoption has 'never been a question of what *is* real but of what is *accepted* as real' (Buscombe, 1985, p. 88). This is to say, a technology must satisfy particular conventions of realism rather than simply providing an allusion to reality. So, for example, whereas colour adhered to the industry's notion of seamless realism, it did not initially adhere to the audience's notion of how seamless realism should appear onscreen.

Albeit briefly, Buscombe (1985, pp. 90 – 91) later states that the presence of stereoscopy in Hollywood shares many elements with the adoption and use of colour film in Hollywood. Both, for instance, have the potential to produce a literal representation of human binocular vision; they both have the potential to be integrated into the production of seamless realism; as well, they both have the potential to contradict seamless realism via a gimmicky celebration of

screen technology, as a spectacle (Buscombe, 1985, p. 91).[7] These characteristics also recall Buscombe's division of the adoption process: screen technology adoption is initially motivated by the economic needs of the industry, and a company, and subsequently motivated by the technology's ability to satisfy the audience's aesthetic needs.

In all, Buscombe's argument is particularly useful in outlining the typical flow of technology adoption, as well as the allusion to the tension between economic needs and audience needs. The argument emphasises the significance of economic factors in initiating adoption. The crux of this is that successful adoption is predicated on the stages of industry, company and consumer audience being in harmony with one another. The screen technology satisfies the initial economic needs of the industry and individual companies, as well as satisfying the needs of the audience. To satisfy one and not the other would mean rejection by the industry or the market.

Industrial, Economic and Aesthetic Factors

Bordwell et al. provide further detail about technology adoption in the chapter, titled 'Technology, style and mode of production', in *The Classic Hollywood Cinema*. They continue to frame screen technology adoption within economic and aesthetic needs, as in Buscombe, but their argument also includes a discussion of adoption in terms of production, distribution and exhibition

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[7] This division between seamless realism and spectacle is what film director, D.W. Griffith outlined in a statement to *The New York Times* during the 1910s and 1920s period of stereoscopy. Griffith said that:

> The true stereoscopic effect will add a mighty force to motion pictures. It will make them beyond any comparison the most powerful medium of expression of which anyone has dreamed … [But] if a powerful dramatic scene were put into a film with absolute stereoscopic vividness, I don't believe an audience could stand it. For instance, suppose we were to show a dagger thrust driving into the very faces of the audience? What would happen? … It would be appalling (Griffith in Kehr, 2010, pp. 62 – 63).

According to Griffith, cast into two distinct forms, stereoscopy has the potential to develop a new cinema as well as to present a cinematic spectacle. The division has since been noted in various instances in each of the subsequent stereoscopy periods, such as in the 1950s period by Nigel and Raymond Spottiswoode (1953) in *The Theory of Stereoscopic Transmission and Its Application to the Motion Picture* (p. 1) and in the 1980s by Richard Patterson (1983) in the editorial for *American Cinematographer* magazine (p. 5).

efficiencies. In effect, Bordwell et al. combine the ideas of economic and aesthetic motivations with more practical-based notions of technological development.

They begin this argument by declaring that 'any technological change can be explained by one or more of three basic causes' (Bordwell et al., 1985, p. 243). In relation to Winston, Wollen and Buscombe, these three basic causes are evidence of further specificity in the understanding of technological adoption. Bordwell et al. (1985) title these causes 'production efficiency', 'point of difference', and 'adherence to standards of quality' (pp. 243 – 244).

The first basic cause, production efficiency, primarily relates to a technology's function in fulfilling an economic need. The technological innovation is adopted because it serves to cut costs by 'saving time or physical capital, or it might make the results of the work more predictable, or it might solve particular production problems' (Bordwell et al., 1985, p. 243). The examples that are given for this cause concern such innovations as light meters or composite photography, which make the work processes of the industry more efficient. In general, this cause regards two aspects of technological adoption. In the first, the technology solves particular issues in production. These issues slow that rate of production or have an impact on the quality of the production. As a consequence, an innovation is adopted to remedy these issues. This adoption refers to the second aspect of the cause, that is, the adopted technology lowers the intensity of labour and, therefore, production costs.

The second basic cause, point of difference, relates to both economic and aesthetic needs, and also reflects the point made by Buscombe regarding Hollywood's primary means of achieving profit or surplus value: product differentiation. Basically, a technological innovation is adopted in order to distinguish a company's products from a rival company's products. The intended result is the technological innovation acts to expand the company's share of the market as more of the audience is attracted to the production with the unique innovation. This result has an impact on pricing, as Bordwell et al. (1985) note: 'such product differentiation can create the appearance of a

monopoly, and, as a result, the manufacturer attains more control over the price of the product' (p. 97). That is, pricing is a factor in the construction of production differentiation. An example that is commonly used to illustrate point of difference is Hollywood's adoption of sound during the late 1920s. The example of sound is cited in both Buscombe and Bordwell et al. As well, it has been studied closely by film historian Douglas Gomery in *The Coming of Sound: A History* and *The Hollywood Studio System* (Bordwell et al., 1985, p. 244; Buscombe, 1985, p. 87; Gomery, 1974; 1986). The example shows that the profits of the companies that innovated and adopted sound increased dramatically. Warner Bros. studio profit is a particular example. According to Gomery (1986), '[i]n 1925, Warners' assets totalled US$5 million; in 1930 they topped US$230 million', in large part because they differentiated their products with the adoption and integration of sound (p. 5). As the Warner Bros. example shows, and as also explained by Buscombe, product differentiation has significant ramifications for industry market share.

In the case of differentiation, Bordwell et al. (1985) emphasise the fact that the Hollywood system encouraged companies to innovate for economic reasons, but these innovations 'had to support or at least not interfere with the controlling standard' (p. 109). In other words, there are in-built boundaries for innovation and differentiation in Hollywood. These boundaries make sure that the core narrative system of classical continuity cinema is not weakened in a studio's move to create new economic strength. So, for instance, '[a] spectacle is only permissible if it is subsidiary to character development' (Carr in Bordwell et al., 1985, p. 109). Screen technologies that provide a point of difference via such means as, for instance, spectacle are only successful within the system when they correspond to the system's core objectives, namely the production of seamless realism.

The significance of the Hollywood system and the screen technology's devotion to it is developed in Bordwell et al.'s third cause, adherence to standards of quality. Here, a technological innovation is adopted because it helps to produce content that is consistent with the aims of the dominant mode of production. That is, it is adopted in order to achieve a standard of production

that had come to be expected by the industry as the industry developed. So, for example, in Hollywood cinema, Bordwell et al. (1985), say, '[s]ynchronised sound, colour, widescreen, stereoscopy, and stereophony were justified as progress toward better storytelling, greater realism, and enhanced spectacle' (p. 244). These technologies suited the evolutionary path of the industry toward its core production ideologies (in the case of Hollywood, realism and spectacle) and were therefore sought after as a technological innovation by the Hollywood studios. In this way, the discussion recalls Buscombe's description of the second phase of technological adoption, in particular its reference to the production of seamless realism.

In terms of screen technology adoption, Bordwell et al.'s approach is significant because of the prominence it gives to industry in dictating the direction of adoption. Adoption is represented as a combination of industrial factors as well as economic and aesthetic needs. In this way, Bordwell et al.'s argument represents an amalgamation of the points made by Winston, Wollen, and Buscombe, as well as the various trade journal and industry practitioner accounts.

1950s STEREOSCOPY: ISSUES, PROBLEMS, AND IDEAS

An example that is consistent among trade journal and industry practitioner and scholarly accounts is the 1950s stereoscopic production boom period, 1952 to 1955. The period is typically cited in these accounts as a means of explaining ideas about the period; stereoscopy, particularly its relationship to the popular film industry and audience; and more broadly, screen technology (Symmes, 1983, pp. 72 – 75, 102 – 117; Salt, 1983, p. 316; Bordwell et al., 1985, p. 245; Buscombe, 1985, p. 91; Belton, 2013, pp. 328 – 329). In these accounts, the period acts as a clear illustrative example of stereoscopic technology development, adoption and decline. This example acts as a base from which is built an easy to understand critique of the main issues, problems and ideas about stereoscopy, such as the tension between economic and aesthetic needs and technological efficiencies which materialise, for instance, in descriptions of gimmick and technological inefficiencies. These issues, problems and ideas are

typically evoked in the literature in order to short-hand the discussion of stereoscopy. That is, they provide a way to reiterate a dominant view, or canonical story, of stereoscopy: rise to a peak and then declining to obscurity. Many accounts of the period offer an origin story of stereoscopy in Hollywood, a story that has implications for the adoption and production of stereoscopy in later periods, including the digital screen period. William Paul (1993), a film historian, for example, refers to the period in the essay, 'The Aesthetics of Emergence', as 'the first great period of 3-D's rise and fall' (p. 321). His assertion in describing it in this way is as much a reference to the period's prominence in the scholarship as it is to the apparent cyclical – rise, fall, and rise and fall again – nature of stereoscopy's narrative.

Told from the perspective of trade journals and industry practitioners, major technological development of the 1950s period primarily occurred in the fourteen months leading up to the Festival of Britain in 1951 (Symmes, 1983, p. 105). Trade and industry accounts typically begin the story of the period in the UK, where a dual camera rig was designed by Leslie P. Dudley, in connection with Raymond and Nigel Spottiswoode. The patent number of the camera, according to Lipton, was '17.086150' (1982, p. 37). The rig used 'two Newman-Sinclairs (35mm) mounted on a common base facing each other with mirrors reflecting the scene into the lens' (Symmes, 1983, p. 105). Several short films were produced using this rig, including two animated films and two live-action subjects (Lipton, 1982, p. 36 – 39; Petrie, 1996, p. 47; Zone, 2012, p. 39 – 40). At approximately the same time in the USA, Friend Baker, Lothrop Worth and O. S. Bryhn in connection with Julian and Milton Gunzberg, designed a similar rig, called Natural Vision (see figure 1.1; Symmes, 1983, p. 105). It was used on nine Hollywood productions, including the independently produced *Bwana Devil* (1952; Lipton, 1982, p. 120). This rig was comprised of two Mitchell (35mm) NC cameras facing at a perpendicular angle to the scene (Williams, 1983, p. 38). The cameras collected right- and left-eye images via two front-surface mirrors at the centre (Lipton, 1982, p. 149; Zone, 2012, p. 9). According to Symmes's account, Friend Baker received a patent for a '16mm system (#2,627,201 – Feb. 3, '53)' design, but no patent is listed for a 35mm rig. In any case, the technological developments and the respective patent claims act as

markers for the period. They highlight the fact that new opportunities for stereoscopic production were available.
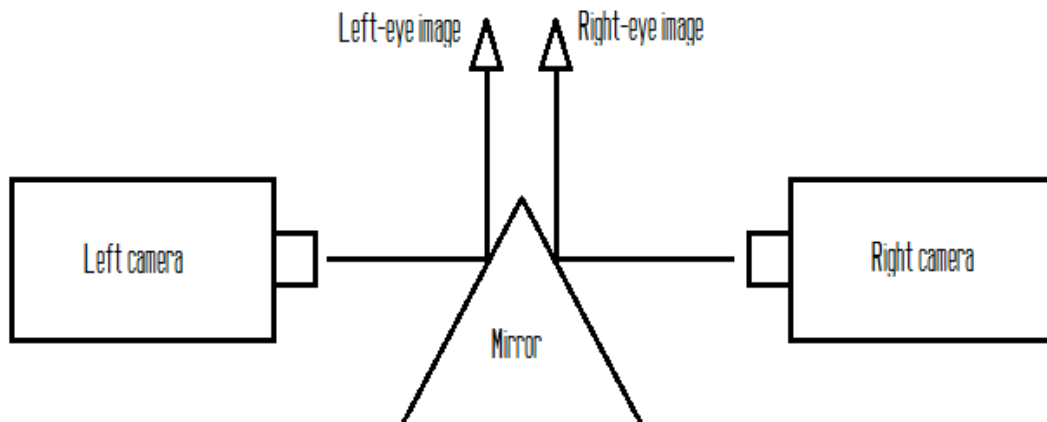
1.1: A basic depiction of Natural Vision. (Williams, 1983, p. 38).

Each rig advanced the quality of stereoscopic production by incorporating new image-capturing processes. On the Natural Vision rig, for example, the interaxial control was locked so as to more closely mimic human binocular vision, hence the name, *Natural* Vision (Lipton, 1982, p. 150; my italics). This feature meant that the only stereo control in use was convergence. According to Lipton (1982), this design made Natural Vision a new innovation to stereoscopic production, 'a genuine contribution to the art' (p. 151); with this arrangement, 'the foreground subject [remains] in the plane of convergence, [and] the subject [remains] at the stereo-window, or in the plane of the screen … throughout the entire shot during projection' (p. 151). So, just as the point of focus is maintained by slight adjustments during a tracking shot, the point of convergence can also be shifted during a tracking shot to maintain the continuity of parallax values. Quoted in the November 1953 issue of *American Cinematographer*, filmmaker and Natural Vision designer, Julian Gunzberg (1954), said the camera produced images that were 'so real, you felt that you could touch them' (p. 534). Its point of difference was a technologically enhanced form of sensory immediacy.

The period's technological developments coincided with the period's key social forces, which are more often recounted by film historians. As told by these historians, the period's major social forces include the relatively new anti-trust

laws that were created in the wake of the USA government's case against Hollywood's oligopoly structure (Conant, 1960, pp. 107 – 153). They also include the increased popularity of television, which had eaten into Hollywood's profits and changed the industry's lucrative product flows; as well, the broad change to social pastimes following the end of World War Two, which resulted in people becoming 'more active, favouring sports and action-based pastimes' (Conant, 1960, pp. 107 – 153; Cooke & Bernink [ed.], 1999, p. 56; Kermode, 2011, p. 134; Belton, 2013, pp. 324 – 325). The effect of these forces, according to film historian accounts, was a significant 'market adjustment' which severely affected studio bottom lines (Salt, 1983, p. 309; Schatz, 1988, p. 412). Theatre attendance in the USA, a key illustrative example of the situation, dropped by approximately 46 percent from around 80 million per week in 1946 to around 45 million in the early 1950s (Lipton, 1982, p. 37; Paul, 1993, p. 323; Zone, 2012, p. 7; Belton, 2013, p. 322). Pressure on the industry also materialised in the form of the House Un-American Activities Committee (or HUAC) which had begun targeting Hollywood production identities, particularly those from the industry's writing community (Schatz, 1988, p. 434). The period is characterised by some as being 'the most unsettled in motion picture history' (Symmes, 1983, p. 104). The unsettled environment contributed to the Hollywood industry finding it difficult to achieve its primary objective: maximising profit and surplus value.

The consensus view that was born out of this environment, then, was that Hollywood needed to change. It needed to adopt a new strategy, a new screen technology. From the industry's perspective, the view was that Hollywood's five major studios, its oligopoly, namely Paramount, Twentieth Century-Fox, Warner Bros., Loew's, and Radio-Keith-Orpheum, needed to re-assert control over the industry and the market. John Belton (1992), in the book *Widescreen Cinema*, for example, argues that:

> [t]o compete with other leisure-time amusements, the
> motion picture experience was in need of redefinition.
> Movies had to become more participatory; the movie
> theatre had to become the equivalent of an amusement
> park (p. 84).

For stereoscopic filmmaker, John A. Norling, the answer was similarly framed in terms of new technology adoption. Norling (1952) also argued that 'the motion picture industry could use something to combat television's capture of more and more of the theatre audience is undeniable' (p. 66). The answer was clear, particularly when considering that the other main avenues to the industry's profit objective were unavailable: the industry's market share was being eroded by other cultural and industrial options, including 'night baseball and bowling to night classes on the GI Bill' (Schatz, 1988, p. 412); production costs could not be reduced; and prices could not be decreased because of new regulation and industry disruption. New innovations needed to be adopted; product differentiation needed to be achieved; and market share of the entertainment sector needed to be reclaimed.

The box-office performance of *Bwana Devil* in 1953 acted to signpost stereoscopy's market potential to Hollywood's oligopoly. According to Belton (2013), *Devil* 'had grossed over US$5 million' by March of 1953 with audiences standing in lines that stretched 'around the block [in order] to catch a glimpse of this new sensation' (pp. 327 - 329). The film's success led to Warner Bros. licensing the Natural Vision camera technology within days of its release, undoubtedly spurred on by their previous experience with sound. In fact, Warner Bros. chief executive, Jack Warner, confirmed as much in an article, titled '1927, Sound – 1953, 3-D', saying that it was the 'showing last November in Hollywood of *Bwana Devil* [that] convinced me that the Natural Vision process was practical and with some refinements could be used immediately' (Warner in Quigley, 1953, p. 87; Zone, 2012, p. 17). These developments are presented in the literature as a sign that the stereoscopic technology was beginning to transition from prototype to mainstream via the economic needs of the industry. Bordwell et al. (1985), for example, say, '[t]he film's sensational opening in Los Angeles seemed to presage a revolution, and in March 1953, studios were eagerly engaged in extensive 3-D production' (p. 245). However, such was the industry's economic need at the time, stereoscopy's adoption was only one of a number of technological innovations that were adopted; which is to say that the industry's approach also included technologies that were more commonly associated with, as Belton argues, participatory platforms, such as

roadshow exhibition, including widescreen presentation formats, [8] stereophonic sound, and an increased use of colour film stock, which in most cases was Kodak's 1950's colour negative, 5247 (Salt, 1983, pp. 309 – 323). Given the number of innovations that were adopted across each major studio, such as Warner's adoption of Natural Vision or Twentieth Century-Fox's development and adoption of CinemaScope, industry policy demonstrates an acknowledgement of stereoscopy as a solution to the economic problem as well as the social competition of the period. Stereoscopy was a point of difference for the industry. Moreover, it had characteristics that could be exploited (Zone, 2012, p. 17; Belton, 2013, pp. 329 – 331).

These exploitable characteristics formed the basis of the production boom. The boom lasted for three years between 1952 and 1955, and during this time 4900 theatres were converted and forty-six stereoscopic feature films were produced (Paul, 1993, p. 323; Belton, 2013, p. 329). Of these films, a considerable number exploited the stereoscopic, negative-parallax, effect. To quote Belton (2013):

> For every quality 3-D production such as *Kiss Me Kate* (1953) or *Dial M For Murder* (1954), there were a half-dozen low-budget B pictures in 3-D, ranging from *Man in the Dark* and *Robot Monster* (1953) to *The Creature from the Black Lagoon* and *Gorilla at Large* (1954; p. 329).

In short, the industry exploited the stereoscopic point of difference through a novelty aesthetic (Bordwell & Thompson, 2013, p. 181). That is, stereoscopy's ability to control negative-parallax – the eye popping sight of an image emerging from the screen plane – became its most marketed and exaggerated feature. Among the forty-six, film promised to 'knock *both* your eyes out' (*The French Line*. Bacon & Hughes, 1953); put a 'Lion in your lap! A lover in your arms!' (*Bwana Devil*); and reach 'from the Screen to Seize You in its Grasp!' (*It Came From Outer Space*. Arnold & Alland, 1953). In other instances, such as The Three Stooges short, *Spooks!* (1953), a hypodermic needle was pointed at the audiences' eyes. Meanwhile, the Lew Landers directed film, *Man in the Dark*

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[8] This included Cinerama (ratio: 2.59:1), CinemaScope (2.35:1), WarnerScope (2.35:1), VistaVision (1.60:1), Todd-AO (2.20:1) and SuperScope (2:1).

(1953), shot a pistol straight into the theatre, and André de Toth's *House of Wax*, used a paddleball that was hit towards the audience to showcase the 'miracle of third dimension' (Foy & de Toth, 1953). At one point during *House*, the paddleball salesman crossed the fourth-wall to directly address the cinema audience, saying, 'Close your mouth, it's the bag I'm aiming at not your tonsils. Watch out here she comes!' (Foy & de Toth, 1953).[9] According to film historian and practitioner, Rick Mitchell (2004), in the essay, '[t]he tragedy of 3-D cinema', the idea of the paddleball salesman character hitting the paddleball out into the audience was not in fact de Toth's idea but Jack Warner's, 'an old fashioned showman, quick to exploit anything that would draw an audience to his company's films' (p. 210).[10] In other words, the period's stereoscopic aesthetic was largely driven by the economic need of the industry. It was exploited, as Belton (1992, p. 84) points out, in order to draw crowds into theatres for an equivalent to amusement park thrills.

Tacky and Clichéd

Understandably, audiences began to believe that stereoscopy was 'tacky and clichéd' (Bordwell & Thompson, 2013, p. 181). The industry's exploitative use 'helped hasten the end of the [period's] cycle' (Bordwell & Thompson, 2013, p. 181). Significant competing interests in the industry also added to stereoscopy's demise. Twentieth Century-Fox chief executive, Darryl F. Zanuck, for example, questioned stereoscopy's adoption altogether, rhetorically asking: 'So you throw things at the audience? You throw fire and water in their faces. How long can we keep that up?' (*Life*, 1953, p. 71). This view, although channelling the audience, was largely motivated by commercial interest. Fox and Zanuck had released the widescreen technology, CinemaScope, two months before *Bwana Devil* and were pushing for greater industry adoption of the widescreen technology (Allen, 1998, p. 112; Paul, 1993, p. 329). As a result, widescreen was positioned in direct

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[9] de Toth had lost his left eye when young. This loss meant he could not see the stereoscopic effect. Raoul Walsh, who directed the stereoscopic film, *Gun Fury* (1953), was another, although he had lost his right eye much later in life in an accident.

[10] The fact that it was not de Toth's idea appears consistent with the filmmaker's particular theory of stereoscopy which emphasises the function of positive-parallax to combine the audiences' space and the filmed space together. Quoted in Symmes (1983), de Toth said, '[stereoscopy] can combine all the forces, all the possibilities, of the motion picture and the theatre. It's not to throw things at you but to involve the audience … Instead of "showing" it [story] to an audience, make them part of it; the feeling, the experience' (p. 52).

competition to stereoscopy: one largely concerned with y-axis width and the other largely concerned with z-axis depth. Nevertheless, they each shared similarities. CinemaScope's marketing, for instance, was similarly based on defining a point of difference, albeit a nuanced difference. That is, instead of novelty, Fox attempted to shape perception around the notion of CinemaScope being a better quality product. Paul (1993) says that the widescreen technology had:

> None of the schlock and exploitation fare so common among 3-D movies could be found in early CinemaScope films, and with good reason: Fox required script approval from all independent producers who wanted to use the process, and further required that all CinemaScope films, from independent studios and majors alike, be made in colour, itself a mark of quality (p. 329).

Widescreen's point of difference was that it was not stereoscopy. It was a quality product that avoided a novelty and gimmick aesthetic. As the marketing gained traction in the industry, perception of stereoscopy shifted again and it came to be perceived as something of an 'other', something that ran contrary to the accepted norm of the widescreen enhanced, conventional production.

Paul (1993, pp. 321 – 355) couches the notion of stereoscopy as 'other' in an analysis of stereoscopy's 1950s aesthetic. He does so by evoking Bordwell et al.'s theoretical analysis of Hollywood's classical continuity system, which he uses to compare and contrast stereoscopy's visual techniques and visual styles against (Paul, 1993, pp. 321 - 322). The conclusion that he makes echoes the broader view of stereoscopy by saying the screen technology 'constantly calls our attention to the fantastic nature of the image, to its almost magical ability to create a seeming reality that is in fact an illusion thinner than the air through which it moves' (Paul, 1993, p. 345). Paul (1993) chooses to explain the stereoscopic phenomenon of negative-parallax via a psychoanalytic approach, which he says is implied in questions about '3-D's aberrational status' (p. 322). Although Paul links his argument to Bordwell et al. in his explanation, he does not elaborate on their theory of classical Hollywood cinema.

Bordwell et al.'s (1985, p. 6) theory of classical Hollywood cinema is made up of three levels: devices; narrative systems; and the relations of these systems. These levels, and their dominant and subordinate structure, illustrate a key reason why stereoscopy failed during the 1950s. Juxtaposed with D3D, Bordwell et al.'s theory is useful in beginning an explanation of the ways that stereoscopic technology's relationship to visual technique and visual style has changed over time. The theory is adopted in this chapter to illustrate the 1950s boom; however, it is employed later to show how the digital screen period is distinct from the 1950s.

The first level, 'devices', refers to the technical elements of film production, such as three-point lighting and continuity editing. These are foundational elements of the classical continuity style, which help to conceal the artifice of production in order to create a form of seamless realism. The second level, the 'systems' of narrative cinema, builds upon this technical foundation with three systems: causal or narrative, spatial and temporal. These systems give the 'devices' direction and purpose in forming a style. To quote Bordwell et al. (1985):

> A style consists not only of recurrent elements [that is to say, devices] but of a set of functions and relations defined for them. These functions and relations are established by a system (p. 6).

Each system employs a device to illustrate a particular storytelling idea, such as a particular fight between good and evil in the story, for instance, set in dramatic low-key lighting. As a result, each system has an impact on each other; the causal system affects the temporal and spatial systems which, in turn, affect each other, and so on: the fight scene occurs in a continuous temporal space illustrated by the spatial relationship of the good and evil sides. This relationship is defined as the third and last level of classical Hollywood. Bordwell et al. (1985) explain that '[i]f systems are relations among elements, the total style can be defined as the relation of those systems to each other' (p. 6). Drawing from a more general theoretical idea of narrative art structure,

Bordwell et al. support their theory of classical Hollywood cinema by citing Roman Jakobson's (1971) notion of the 'dominant':

> The *dominant* may be defined as the focussing component of a work of art: it rules, determines, and transforms the remaining components. It is the dominant which guarantees the integrity of the structure (p. 82; my italics).

In relation to the classical Hollywood cinema, it is the causal system that functions as dominant, with the spatial and temporal systems playing a subordinate role: the narrative consequence of the fight between good and evil is the main concern, with the spatial and temporal systems acting to illustrate the fight in plausible detail.

An Aberrational Style

In this context, 1950s stereoscopy is understood to have different qualities. Bordwell et al.'s description of the three levels of Hollywood cinema – a theoretical framework for the discussion of stereoscopy – highlights the differences between key effects of positive- and negative-parallax stereoscopy and conventional Hollywood production. It shows that novelty stereoscopy acted to change the dynamic of the relations between the systems, the third level of classical Hollywood cinema; hence its description as 'an aberrational style' (Paul, 1993, p. 321).

The difference is based upon the fact that in addition to conventional means of depicting depth, such as *mise-en-scène* (specifically, occlusion, relative size and movement), lighting, setting, costumes, lens choice, focus, camera angle, and continuity editing, stereoscopy achieves an emphasis on depth with interaxial and convergence controls. To reiterate a point made in the Introduction, these controls manage the intensity or volume of the stereoscopic image and its positions along the z-axis. Their use means that stereoscopy is more closely related to classical Hollywood cinema's spatial system rather its causal or temporal systems. This relationship alters how the systems interact with each other. So, instead of the causal system dominating the construction and design of the film image, as per conventional Hollywood cinema, the spatial

characteristics of the image become more dominant. Consequently, the hierarchical structure of classical Hollywood cinema was changed during the 1950s period, making stereoscopy an 'other' in relation to conventional, classical Hollywood cinema (Paul, 1993, p. 321).

In order to illustrate the main differences between 'other' and 'norm', Paul contrasts novelty stereoscopy with widescreen technologies.[11] For Paul, the two are almost diametrically opposed; nevertheless, they both enhance the portrayal of depth on-screen. In widescreen, for example, he says the rapid forward tracking shot artfully 'underscore[s the audience's] passivity and threaten[s] to deny [their] individuation from the space of the image' (Paul, 1993, p. 339). He also says widescreen has greater potential to be immersive, and it has the benefit of being a vehicle for the narrative while also emphasising the spatial system via the larger screen. This is because the larger screen engulfs the audience's visual field, provoking them to look into the filmed scene. An anecdote about this form of immersion is included in John Belton's (2013) *American Cinema / American Culture* about the Cinerama film, *This Is Cinerama* (see figure 1.2; 1952) and 'World War II flying ace General James Doolittle'. The story goes that the images were so real that when Doolittle was watching the film he 'reportedly clutch[ed] his chair during the stunt-flying sequences' (Belton, 2013, p. 328). Another anecdote has 'local drugstores [making] a fortune selling Dramamine to spectators who became airsick during the film' (Belton, 2013, p. 328). The suggestion is that a provocative sense of immediacy was achieved with widescreen, which has fewer associated technologies than stereoscopy, as in stereoscopic cameras, glasses and polarised projection equipment.

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[11] This method is similarly adopted by Belton (2013) who points out that 'the film industry flip-flopped back and forth between 3-D and non-anamorphic widescreen formats' between September 1952 and September 1953 (p. 330).

1.2: *This is Cinerama* compels the audience to look *into* the image.

In contrast, Paul (1993) points out that '[w]hat 3-D had that Cinerama and CinemaScope clearly did not was the phenomenon of emergence' (p. 327); it had what Bordwell and Thompson (2013) derogatively call the 'assault-the-audience option' (p. 181). In Paul's view, whereas widescreen enticed the audience in, novelty stereoscopy typically emerged out of the screen to reduce the audience's space and push them away. This characteristic, he argues, left novelty stereoscopy with only two forms to succeed in, namely sex and horror, both of which are used by Paul to introduce a psychoanalytic approach to stereoscopic visual style:

> 3D with its profusion of threatening objects that penetrate the theatre's auditorium sketches out a male space … [Its] mode of address is aggressive: it is constantly moving into the audience space in a way that is experienced as threatening' (Paul, 1993, pp. 339 – 340).[12]

In other words, negative-parallax is representative of the male gender. This criticism is further supported in Paul's argument by a number of taglines from 1950s stereoscopic film advertisements, such as *Bwana Devil*'s tagline, which

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[12] Akira Lippit (1999) also refers to 'the genres of excess (horror, soft-porn, exploitation)' in relation to stereoscopy in the essay, 'Three Phantasies of Cinema – Reproduction, Mimesis, Annihilation' (pp. 213 - 214).

presents horror and sex in equal terms: 'A lion in your lap, a lover in your arms'.[13] Paul (1993) says that the stylistic manifestation of these forms contributed to stereoscopy's eventual failure in the 1950s:

> The psychological appeal of 3-D ... is that it presents us with a kind of irreality testing ... Translating this perception phenomenon into psychoanalytic terms, as 3-D narrative films inevitably did, the reality testing becomes a testing of integration of both body and mind images. With the first threatening object flung from the screen, we inevitably duck, flinch, or even close our eyes. With each successive object, we still experience the shock to our nervous systems but we also learn we can stare it down without threat of actual dismemberment (p. 343).

So, just as negative-parallax stereoscopy thrills our senses, it also gradually renders itself ineffectual. The audience slowly but surely becomes aware of the illusion of the novelty aesthetic and consequently scrutinises the causal actions of the story for satisfaction. Over time the image loses its connection to the classical Hollywood's typical rendering of seamless realism and becomes an unsatisfactory and superficial variant to the conventional: an aberration.

Tasteful and Fresh

A key implication of Paul's argument is that films that rely on negative-parallax techniques have significant limitations that are not shared by widescreen films. By extension of widescreen's inward view, this implication also relates to distinctions in stereoscopic style; that is, the various stereoscopic films that largely forego negative-parallax in order to render depth in positive-parallax are, like widescreen, also considered superior. Common among accounts of the 1950s period is a consistent list of positive-parallax film examples that are highly regarded (Lipton, 1982, p. 40; Salt, 1983, p. 316; Belton, 2013, p. 329; Kehr, 2010, p. 64). This list typically includes Alfred Hitchcock's *Dial 'M' For Murder*, *Hondo* (1953), *Money From Home* (1953), *Miss Sadie Thompson* (1953), and *Taza, Son of Cochise* (1954); each one is argued to treat stereoscopy and the spatial system with more restraint and thematic cause than the

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[13] A digital screen period recent example of this type of marketing is *Piranha 3DD*'s [2012] tagline which reads, 'Twice the terror. Double the Ds'.

dominant novelty aesthetic. This restraint means that they are aligned more closely with classical Hollywood cinema structure.

In general, the reference to positive-parallax films – an effect that Bordwell and Thompson call the 'window view' (another euphemism for cinematic realism [Bordwell & Thompson, 2013, p. 181]) – works in two main ways. Firstly, it illustrates a type of evolutionary artistic step. However, it is a step that ultimately arrives too late to save the screen technology from its decline. As the story goes, even though *Dial 'M'*, *Money*, *Taza*, and so on, were produced in stereoscopy they were 'exhibited primarily in flat (non–3-D) versions' because the industry had begun to phase out the screen technology by the time of their respective 1954 releases (Salt, 1983, p. 316; Belton, 2013, p. 329; Paul, 1993, p. 330 – 331; Kehr, 2010, p. 64; Kermode, 2011, p. 137). Consequently, the evolved, positive-parallax visual style was not ultimately popularised in the mainstream to avoid a decline. Even so, these films were viewed by popular critics and scholars as being emblematic of a better and more refined way for stereoscopy to be produced. An example of this view is put forward by popular critic Dave Kehr in relation to *Dial 'M'*. He argues that '[w]ith its subtlety and restraint, *Dial 'M'* might have provided a paradigm for the stereo film of the future' (Kehr, 2010, p. 64). In correlation with the high regard for positive-parallax films is the second aspect; that is, by pointing out that these films are favourable alternatives, the reference serves to contrast against the novelty aesthetic. This argument is to adopt a polemical view that if the novelty of negative-parallax is deemed to be 'tacky and clichéd' then the positive-parallax films must be considered something that is tasteful and fresh. The screen technology had seemingly progresses away from satisfying an immediate economic need and moved into a different phase which explored the diverse possibilities of the relationship between screen technology and visual technique and visual style.

This line of argument relates back to Buscombe and his discussion of screen technology adoption. That is, the basis of stereoscopy's short-term adoption was to fulfil the industry's and individual studio's economic needs. This need, as noted above, drove the adoption of spectacle cinema, which

materialised in a novelty, negative-parallax-based stereoscopic aesthetic. Subsequently, the screen technology was required to adhere to the dominant ideology of the industry (realism) via classical cinema's hierarchy of systems (seamless realism). This adjustment occurred in order to satisfy the audiences' need and to move toward achieving a long-term adoption. So, following a transition from prototype to market, as per Winston, the technology experienced a need to transition again. To quote Belton (1992), this transition was 'from novelty to norm' (p. 34). The line of argument also follows the general trajectory of the third, fourth, and fifth phases of the 'Hype Cycle', a technology measure that was developed by information technology research and advisory company, Gartner Inc. It broadly projects the main phases of technology adoption. Terry Flew (2011) argues in *New Media* that the term 'hype' is a recurring feature of the popularisation of technology, specifically digital technology, which concerns a general expectation that the new technology will act as a silver bullet and 'change everything, typically for the better' (p. 52). The term is particularly relevant in respect to phases one and two of the 'Cycle', while phases three, four, and five illustrate a complex adoption process toward a technology becoming a norm. The five Hype Cycle phases are shown in figure 1.3.

	Hype Cycle Phases	Explanation
1	Technology Trigger	'A potential technology breakthrough kicks things off. Early proof-of-concept stories and media interest trigger significant publicity. Often no usable products exist and commercial viability is unproven'.
2	Peak of Inflated Expectations	'Early publicity produces a number of success stories—often accompanied by scores of failures. Some companies take action; many do not'.
3	Trough of Disillusionment	'Interest wanes as experiments and implementations fail to deliver. Producers of the technology shake out or fail. Investments continue only if the surviving providers improve their products to the satisfaction of early adopters'.
4	Slope of Enlightenment	'More instances of how the technology can benefit the enterprise start to crystallize and become more widely understood. Second- and third-generation products appear from technology providers. More enterprises fund pilots; conservative companies remain cautious'.

5	Plateau of Productivity	'Mainstream adoption starts to take off. Criteria for assessing provider viability are more clearly defined. The technology's broad market applicability and relevance are clearly paying off'.

1.3. Gartner's Hype Cycle (Gartner, 2012).

The initial, booming transition from 'Trigger Technology' to 'Peak of Inflated Expectations' corresponds to an emphasis on product differentiation and the technology's novelty period. This precedes a significant drop in satisfaction, namely the 'Trough of Disillusionment', and later stabilisation in 'Slope of Enlightenment' and 'Plateau of Productivity'. These later periods reflect what Belton is describing with his identification of a novelty to norm transition.

Kehr similarly identifies a novelty to norm transition phase and notably combines it with the narrative concerning aesthetic evolution in his discussion of stereoscopic technology and aesthetics in *Film Comment* magazine. He concludes a brief discussion of the 1950s period by emphasising the inevitable need for stereoscopy to fit in to the classical hierarchy, referring to negative-parallax films as 'outies' and positive-parallax films as 'innies'. Kehr (2010) argues that:

> As the novelty appeal of the outies waned (the film-going audience could only stand so much ocular abuse), the studios realized that any chance of taking the format to the next level, that of critical respectability and long-term viability, rested on shifting to an innie approach. Bigger-budget films began to appear ... Most of these more prestigious productions carefully eschewed "lions in your lap" in favour of regressive, depth-enhanced long shots. Clearly 3-D had to absorb into the language of Hollywood realism – just as the disruptive elements of sound and colour had been reined in and naturalised – if the process was to be anything more than a sideshow (p. 64).

In other words, the industry found that a different approach to novelty stereoscopic production was needed in order to achieve the transition to norm, a stable long-term presence. Stereoscopy was experiencing a period akin to the Cycle's third phase, 'Trough of Disillusionment'. So, instead of maintaining what Paul refers to as an aberrational style that risks disengaging the market, the idea emerged to combine stereoscopy with classical Hollywood cinema and the

production of seamless realism. As such, *Dial 'M'*, *Money*, *Taza* and so on, loosely illustrate the fourth phase of the Hype Cycle, 'Slope of Enlightenment'. The development of a window or an inward view stereoscopic aesthetic appears pre-destined; the power of the market essentially motivating the industry to counter the overt, novelty of negative-parallax. One consequence of Kehr's argument is that later marketing of D3D as an immersive tool – given voice by practitioners, such as Katzenberg (Giles & Katzenberg, 2010, p. 10) and Wim Wenders (in James, 2011, p. 22) – is simply adhering to the paradigm that the market decided upon in the latter stages of the 1950s boom period.

In Kehr, as in Paul, a critical approach to a stereoscopic aesthetic is referenced but not defined. Nevertheless, Kehr's argument is summarised in terms of restraint of aesthetic stylisation in correspondence to the seamless realism of classical Hollywood cinema. Kehr and Paul both argue that negative- and positive-parallax should only be used when it supports the notion of seamless realism. In most cases, this definition favours the use of positive-parallax over the use of negative-parallax, since well received stereoscopy is that which fulfils Hollywood's need to disguise the production process whereas negative-parallax is argued by Paul (1993) to call attention to the production after multiple views (p. 343).

Explaining The Decline

The decline of the 1950s period is typically framed in terms of aesthetic, technological and economic factors (Bordwell et al., 1985, p. 245; Buscombe, 1985, p. 91; Kermode, 2011, pp. 137 – 139; Christie, 2014, p. 126; Wollen, 1980, p. 19). Stereoscopy became a novelty which traded on negative-parallax images; it was difficult to integrate into production, distribution and exhibition processes; and the cost of integration was prohibitive to industry at a time of financial downturn. To quote Bordwell et al. (1985):

> Although stereoscopic pictures provided product
> differentiation, they failed. The technology could not
> assure a high-quality product at each screening, and
> another innovation, widescreen, seemed a more efficient
> way to provide the novelty the industry sought. 3-D did not

become standard because its disadvantages outweighed its advantages (p. 245).

In short, stereoscopy succeeded in providing the industry with product differentiation, but it failed to provide industry efficiencies and adhere to the dominant industry ideology. The broad conclusion is that stereoscopy was just not suited to the industry or the mainstream audience.

This conclusion is similarly made in practitioner accounts, such as in Lipton, Zone and Dominic Case. In Lipton (1982, p. 152) and Zone (2012, p. 12), the 1950s cameras are stated to have been too large and also difficult to manage technical processes such as alignment. Zone (2012) even refers to the Natural Vision rig as being so big that it was nicknamed the 'barndoor' (p. 12). In Case's (2007, pp. 44 – 45) brief historical analysis of the 1950s period it is the screen technology's relationship with and integration into the distribution and exhibition sectors which caused major problems for stereoscopy's long-term potential.

The main problem was cost. For example, Case (2007, p. 44) says that the need for two film prints (one for the right eye and another for the left eye) naturally led to extra costs during distribution, thereby offsetting a portion of box-office. In addition, the distribution sector incurred extra costs relating to maintenance of prints. In instances when prints had variations in colour balance, or dirt or scratches, the distributor most likely needed to produce and distribute another print (Case, 2007, p. 44). In terms of the exhibition sector, extra costs typically related to running two projectors at once, and therefore doubling the maintenance costs of the projectors. Contributing more to the exhibition sector's financial burden were the procurement and replacement of projector equipment and stereoscopic glasses, and staff training in projection and equipment maintenance. Across each sector, the fluctuation between polarised and anaglyph stereoscopic systems similarly contributed to stereoscopy's integration cost. According to Case (2007), the cost of the polarised projector system eventually 'led some studios to switch to the earlier, but less satisfying, two-colour anaglyph system' (p. 44). As the production and distribution sectors switched, this necessitated that the exhibition sector switch

too, at a cost; all of which occurred at a time when the industry was financially and culturally contracting (Buscombe, 1985, p. 91). The combination of lower returns for novelty aesthetic films and the growing costs associated with technological integration and implementation meant that stereoscopy in the 1950s did not progress to what the Hype Cycle refers to as the plateau of productivity; instead it declined, failing to make a clear transition away from novelty.

THE DIGITAL SCREEN PERIOD

The description of the 1950s period in scholarly, industry, and popular critical literature is significant because it helps scholars to frame stereoscopy as well as to define the various periods. The major factors of the 1950s period, for instance, were evoked in initial accounts of digital screen period stereoscopy (D3D). The most visible of these include the work of popular critics, Roger Ebert (2010a, 2010b) and Mark Kermode (2009; 2010; 2011) as well as scholars, such as Bordwell and Thompson, which are found in scholar blogs (Thompson, 2011a; 2011b; 2011c; 2011d) and in academic books, such as Bordwell's *Pandora's Digital Box: Films, Files and the Future of Movies* (2012, pp. 64 – 82). In each, as Thomas Elsaesser argues in the essay, 'The "Return" of 3-D: On Some of the Logics and Genealogies of the Image of the Twenty-First Century' (2013), the 1950s, its themes, its developments and ideas, are evoked in order to explain the motivational causes that led to stereoscopy being returned.

A common argument that binds the initial accounts of D3D together is the comparison between the economic contexts of the 1950s and the digital screen period. Most notable is the shared notion of a threat to the film industry, such as the threats of television in the 1950s and the internet in the digital screen period (Elsaesser, 2013, p. 219). Elsaesser (2013) summarises this argument, by saying:

> [As in the 1950s,] Hollywood once more panicked, this
> time in the face of increased competition from the internet
> and a dramatic drop in DVD sales. To combat the threat of
> piracy, as well as upgrade the event character of going to a
> movie theatre for a night out rather than watch a film as

streaming video on your home entertainment centre, via Netflix or iPad, Hollywood had to come up with a new gimmick – a special effect – and to hype a new attraction. The new gimmick in fact turned out to be an old gimmick that had already been short-lived the first time around ... (p. 219).

The 1950s period and the digital screen period have corresponding threats to industry, which broadly illustrate the motivation by industry to adopt the stereoscopic technology. The case has been made that D3D would inevitably follow the 1950s period and the canonical story and eventually fail. This expectation is most clearly argued by Kermode (2011) in *The Good, The Bad and the Multiplex*, where one of the chapter headings is, in fact, titled, 'The Inevitable Decline of 3-D' (pp. 121 – 166).

However, Elsaesser (2013) argues that 'the return of 3-D might be better described as either never having been away or as the return of the repressed' (p. 228). So, for instance, even though stereoscopy failed to reach the so-called 'plateau of productivity' in the 1950s, the mix of factors relating to technological, economic and aesthetic characteristics means that stereoscopy may return in new contexts for similar or different reasons. These new contexts provide D3D with further possibilities of commercial, industrial and aesthetic exploration and significance. Here, multiple lines of cause and influence may or may not fully meet up, which leads, in D3D's case, to be taken up and sustained or otherwise adopted and later rejected (Elsaesser, 2013, p. 228). Elsaesser (2013) makes this case by canvassing several counter-narratives that provide greater detail about the digital screen period (pp. 220 – 221). They include arguments about D3D's long-term impact on other media devices (Elsaesser, 2013, pp. 221 – 225); about the dimensions of the image catching up to the dimensionality of surround sound (pp. 225 – 228); that stereoscopy preceded conventional image production; and filmmaking trends toward making the characteristics of the D3D image invisible (pp. 228 – 246). The broad argument here is that '[w]e are not in the 1950s' (Elsaesser, 2013, p. 221); or rather, that viewing the digital screen period solely through the lens of the past means that elements that are unique to the digital period are lost.

One of the key distinctions Elsaesser makes in regard to the digital screen period concerns the expansion of industry. Unlike the 1950s period, 'Hollywood is present in all media and all markets, off-line in physical space, online in virtual environments, and on the domestic and global markets' (Elsaesser, 2013, p. 221). This distinction means that the tension and competition between the film industry and its rivals, for instance television and the internet, are misrepresented when viewed in regard to the canonical story. In the case of television, recalling its threat to the film industry would mean that 'Hollywood is in competition with itself, which makes no sense' (Elsaesser, 2013, p. 221). In terms of the internet, the threat is similarly misunderstood. For Elsaesser (2013), 'the danger is less the web per se, but the web's business model, where so much content is either free or priced too low to return a profit because content on the web is a means to an end, not an end in itself' (p. 221). Specific issues, problems and ideas are different from the past, and they necessitate more nuanced analysis of D3D and the digital screen period.

Industrial Power Struggle and the 'Killer App'

An important element of the initial accounts of the digital screen period concerns D3D's impact on Hollywood industry sector relations. Belton, and Bordwell and Thompson, for example, each make the point that D3D was a 'killer app' for Hollywood's major studios (Belton, 2012, pp. 187 – 189; 2013, p. 339; Bordwell, 2012, pp. 64 – 82; Bordwell & Thompson, 2013, pp. 180 – 181). Elsaesser (2013) makes a similar point (p. 222). D3D, the killer app, is understood to have shifted the balance in the power struggle between Hollywood's major distributing studios and the exhibition sector toward the studios. In each of the initial accounts, D3D helped to convince the exhibition sector to take on the cost of digital projection. As well as extra costs, the accounts note that the sector was pushed to adopt particular standards, namely the DCI exhibition standards (Bino, 2013, pp. 97 – 100; Bordwell, 2012, pp. 66 – 67; Elsaesser, 2013, p. 222). In effect, D3D helped to re-contextualise industry relations with various distribution-oriented, cost-based efficiencies.

In terms of Hollywood's response to the threat of the internet's business model, Elsaesser (2013) also says that D3D provides a significant benefit as a means of point of difference (p. 221). However, point of difference in the digital period is distinct from other periods. Unlike the 1950s when stereoscopy was generally limited to single productions, D3D works in collaboration with franchise production, merchandising and themed entertainment. This collaboration expands the scope and the number of pathways that connect consumers to Hollywood's productions, and results in greater intellectual property revenues (Elsaesser, 2013, p. 221). The size of the point of difference is much larger than in previous periods, making the relationship between the use of D3D and other products in the franchise more complex. For instance, D3D's point of difference functions externally in the same way as before. D3D content is differentiated from rival productions and rival media, and also differentiated from conventional productions within the franchise. In this respect, Elsaesser (2013) makes a simple but crucial point about the digital period:

> 3D is hyped on the big screen also for the same reason that all films are hyped on the big screen: the theatrical release of a film is the marquee and billboard that allows a movie property to accrue cultural capital and enter all the subsidiary markets that eventually decide whether or not it is a commercial success (p. 223).

In other words, D3D continues to satisfy the economic need of the industry, even if the shape of the industry and its productions are considerably different to previous periods.

Elsaesser also acknowledges the closer and wider ranging relationship between D3D and subsidiary markets. This point illustrates the studios' collective intention for D3D to function on a different basis and in a larger context than before. As a result, Elsaesser's (2013) argument contextualises D3D in terms of multiple media production and multiple markets (p. 224). D3D is not just a film industry-based technology, as per the canonical story; it is also connected to and targeted at, among others, television and internet markets.

There is a corresponding argument to this expanded context which concerns D3D's cultural and aesthetic connection to storytelling. Here, D3D is validated by various developments in aesthetic expression that correspond to its uptake by *auteur* filmmakers. In this way, D3D can be thought of as:

> the vanguard of a new cinema of narrative integration, introducing the malleability, scalability, fluidity, or curvature of digital images into audiovisual space – doing away with horizons, suspending vanishing points, seamlessly varying distance, unchaining the camera and transporting the observer – then the aesthetic possibilities are by no means limited (Elsaesser, 2013, p. 237).[14]

That is, just as the economic and technological context has expanded so too has the aesthetic context.

In addition to Elsaesser's analysis, some of the main sources of this argument include Ray Zone's (2012, pp. 141 – 235) practitioner account of stereoscopy in the 1980s and 1990s, and Frank Rose's (Rose, 2011, pp. 47 – 76) journalistic account of digital media production in *The Art of Immersion*; scholarly discussions of digital media storytelling by Vivian Sobchack (in Redmond, 2004a, pp. 220 – 227), Janet Murray (1997, pp. 44 – 51), Henry Jenkins (2006, pp. 93 – 130) and Shilo McClean (2010, pp. 1 – 60); as well parts of David Bordwell's discussion of contemporary Hollywood cinema mode of production in *The Way Hollywood Tells It* (2006, pp. 58 – 62). In many ways, the argument traces back to the 1980s period to what Zone (2012) refers to as stereoscopy's 'immersive age' (p. 141).

According to Zone, 'the immersive age' brought into full relief production that expanded stereoscopy into different visual media. The stereoscopic image became a means for the audience to interact with the virtual and alternate realities of each production, often framing the image as spectacle (Zone, 2012,

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[14] Scholar, Ian Christie (2014), iterates Elsaesser's argument in the essay, 'Will the 3D Revolution Happen?', by saying, '3D digital cinema also offers us, even if only on rare occasions, a unique contemporary experience of the technological sublime' (p. 135).

pp. 143 – 148). This includes innovative wide-gauge and high-frame rate systems, such as those used in IMAX and Showscan;[15] digital game devices, namely the Sega Mega System's SegaScope; digital game products, such as the John Dykstra directed *Sewer Shark* (1993); and the introduction and development of simulation rides, such as *Back to the Future: The Ride* and *Star Tours*. Each production attempted to construct detailed interactive and immersive environments that engage and reconfigure an audience member's psychological position in relation to the projected image. This emphasis on depth, as Vivian Sobchack (in Redmond, 2004a) says in the essay, 'Postfuturism' (pp. 220 – 227), from 1987, notionally combats the dominance of two-dimensions in popular culture, or what Takashi Murakami calls, 'superflat' (Murakami, 2000). Sobchack (in Redmond, 2004a) argues that:

> To a degree, [spatial depth] has become flattened by the superficial electronic "dimensionality" of movement experienced as occurring on – not in – the screens of computer terminals, video games, music videos, and movies like *Tron* (1982) and *The Last Starfighter* (1984) … space is now more often a "text" than a context. Absorbing time, incorporating movement, figuring as its own discrete event, contemporary space has become experienced as self-contained, convulsive and discontiguous (p. 223).

In other words, the widespread adoption of screen technologies throughout the 1980s and 1990s meant that height and length were emphasised while depth was only alluded to via monoscopic techniques (or devices), such as lighting, costumes, continuity editing, *mise-en-scène* and so on. Sobchack's point recalls the idea that greater dimensionality correlates to a more detailed representation of human binocular reality. The notion of verisimilisitude, which is in contrast to the negative-parallax stereoscopy of the 1950s, is therefore once again applied in order to understand the significance of cinematic stereoscopy in the digital screen period.

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[15] Showscan combines 65mm film with a 60 frames per-second rate. As Douglas Trumbull (2008) describes it, 'We [Richard Yuricich and I] had this amazing epiphany that when you raise the frame rate from its standard of 24 fps to a new standard to 60 to 66 fps you tremendously increase human physiological stimulation, the image becomes very three-dimensional, it looks like a window onto the world instead of a two-dimensional screen, it becomes extremely participatory'. The recent discussion and use of higher frame rates for stereoscopic films, such as *The Hobbit* (2012) and potentially *Avatar 2* and *3*, recall much of Trumbull's and Yuricich's work (Labrecque, 2012).

This argument has strengthened over time with further scholarly discussion in line with Elsaesser which explicates an invisible D3D, a form of phenomenological real (Elsaesser, 2013, pp. 235 – 240).[16] In Rose Woodcock's (2011) essay, 'Predatory Vision: 3D imaging and the transformation of screen-space', for example, the illusion of binocular vision in Hollywood production is such that Woodcock argues that 'contemporary 3D imaging marks an epistemological visual-perceptual shift: toward screenspaces becoming spaces for potential action' (p. 1). This re-configuration of the audience's relationship to the screen image is balanced upon the verimilisitude of the binocular experience. It recalls Sobchack's (2004b) notion of 'embodiment' as 'a radically material condition of human being that necessarily entails both the body and consciousness, objectivity and subjectivity, in an irreducible ensemble' (p. 4). The significance of D3D is that the audience is prompted into 'seeing as *doing* rather than seeing as thinking' (Woodcock, 2011, p. 1). D3D allows filmmakers to creatively explore the various ways that an audience responds to images.

In much the same way, Miriam Ross has argued that the motivated 'doing' action that audiences feel when viewing D3D corresponds to notions of a habitable screen space (2012, pp. 381 – 397; 2015, pp. 18 – 46). This space, Ross (2012) says, is otherwise understood as being derived from 'a depth that includes texture and the desire to touch and be touched by this texture' (p. 384).[17] That is, the doing action relates to attempts to embody the projected space, and to feel and be touched by this space. This desire is what Ross calls '*hyperhaptic* visuality', which she defines in relation to an idea from Laura

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[16] Elsaesser has speculated on the application of D3D in seamless realism production. He says:

> The new 3-D is not a "return of deep space" in the manner of protruding objects in 1950's creature features, 3-D's re-emergence is more likely to evolve towards extending the expressive as well as conceptual registers of post-Euclidian space and, thus, may enlarge the scope of perceptual responses, deepen the affective engagement of the spectator, and work towards integrating the originally disruptive effects of stereoptic depth cues with other monocular depth cues, such as resolution, shading, colour, and size (Elsaesser, 2013, p. 240).

[17] Ross (2011) has previously examined this phenomenon during a study of stereoscopic dance films for *Senses of Cinema* titled, 'Spectacular Dimensions: 3D Dance Films'.

Marks's *The Skin of the Film: Intercultural Cinema, Embodiment, and the Senses* (Marks, 2000; Ross, 2012, p. 384). Marks (2000) writes:

> Haptic visuality is distinguished from optical visuality, which sees things from enough distance to perceive them as distinct forms in deep space: in other words, how we usually conceive of vision. Optical visuality depends on separation between the viewing subject and the object. Haptic looking tends to move over the surface of its object rather than plunge into illusionistic depth, not to distinguish form so much as to discern texture. It is more inclined to move than to focus, more inclined to graze than to gaze (p. 162).

That is, haptic visuality concerns a combination of senses, such as vision and touch, a 'tactile quality of images' (Ross, 2012, p. 384). Meanwhile, hyperhaptic visuality is the production of this type of spectatorship that is extended via an orientation of senses (Ross, 2012, p. 384).

In many ways, the term 'immersion' is a synonym for haptic and hyperhaptic visuality. It similarly represents notions of traversable and inhabitable screen-spaces, and is often evoked in the same way to illustrate various examples of 'doing' D3D. Janet Murray's (1997) account of stereoscopy in *Hamlet on the Holodeck* is an early adopter of the term (pp. 44 – 49). In it, Murray recalls her experience watching the 1995 full-length stereoscopic film, *Wings of Courage*, in an IMAX theatre.[18] *Wings*, Murray says, tells the story of Henri Guillaumet during 1930 when his plane crashed into the Andes, near Laguna del Diamante, in Argentina. Murray (1997) continues:

> Perhaps the most compelling environment in the film is the cave that Henri makes beside the wreckage. It is here that I experienced a surprising intimation of the dramatic potential of this medium. The hero Henri is describing, in voice-over, his plans for survival, carefully calculating the distance he must walk to safety and the time it will take to get there, as if he is writing a pilot's logbook. His public

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[18] According to scholar, Michael Allen (1998), the *Wings* production used a 158 kg (350 lb) double camera rig 'with two lenses set an eye-span distance apart' (p. 116). This rig used four lens settings: 30mm, 40mm, 60mm and 120 mm. A 2-D rig was used for long shots over 15 m (50 feet). Allen says the size of the 3-D rig 'resulted in an average of only four set-ups a day, and the consequent heavy pre-planning meant that filming lacked any spontaneity or improvisation' (p. 116).

voice is full of stoic resolve. But from the back of my headset comes a fearful whisper: "It can't be done. It simply can't be done". The filmmaker has taken me inside Henri's mind with startling effect … in the context of the film, Henri's whisper of self-doubt is a moment of unmediated intimacy. It gave me chills not because of the gimmickry but because it brought me into unexpected closeness with this particular human being in his struggle for courage. At this one moment in an otherwise uninvolving story, I could sense the potential of this technology to take us seamlessly into a character's mind. The three-dimensional sound and images held out the possibility of a dramatic art form that can juxtapose the inner and the outer life as easily and gracefully as prose (p. 49).

The combination of surround sound – predating Elsaesser's argument – and stereoscopy pulled Murray into the on-screen action and subsequently compelled her to share Guillaumet's struggle to survive. For Murray, the stereoscopy complemented the first-person treatment of Guillaumet's story as well as the design of surround sound and the detail of the setting. The example is significant in illustrating the ways that stereoscopy has the potential to enrich the cinematic representation of the inner-life of a character. For Murray, this representation aligns the film medium more closely with literature, which is typically considered a higher form of art.

This immersive effect, and its use in representing the emotional inner-life of various characters, has since been exploited by a number of D3D filmmakers. Scholar, Pam Cook makes this point in a blog post titled, 'Within and without: *The Great Gatsby*'s 3D experience', which is included on Cook's own blog, *Fashion>Film*. Cook's (2013) main example is Baz Luhrmann's *The Great Gatsby* which uses the effect to entice the audience into the story world, to touch and be touched by, but also to demonstrate the emotional distance between characters. That is, she argues that the filmmakers create barriers to deny the audience the illusion of touch. It represents the creation of form and content unity:

> The strategy of denying the viewer the illusion of touching is central to the story and Gatsby's doomed desire to touch the green light and realise his dream of possessing Daisy.

> It transmits a powerful sense of loss: like Gatsby, we reach
> out to grasp something unattainable. And it intensifies the
> contradiction at the heart of cinema: the sense viewers
> have of being there yet being absent (Cook, 2013).

So, rather than transition the audience into the screen-space, the film exploits the effect by refusing the audience entry into the screen-space. Another example is detailed in a post by Bordwell, titled 'Say hello to GOODBYE TO LANGUAGE', which he shared on his (and Thompson's) blog, *Observations of Film Art*. Bordwell explains that the director Jean-Luc Godard similarly played with notions of haptic and hyperhaptic visuality in *Adieu au langage* (2013). The film simultaneously invites the audience into the space and also uses barriers to stop their participation (Bordwell, 2014). In one instance, Bordwell (2014) recalls that a chair is positioned to be 'neither fully in our lap nor fully integrated into the fictional space' so that it 'juts out and dominates the composition, partly blocking the main action'. This positioning means that the audience is prompted to reflect on their own position in relation to the chair and the characters and objects behind the chair. Godard asks the audience to inhabit the screen-space while also reminding them of their position in the theatre.

The malleability of digital production as well as the various attempts by filmmakers to extend the aesthetic developments of 1950s positive-parallax films has meant that D3D is produced in diverse ways. The function of D3D in many digital screen productions is to provoke audience responses that relate to touch. *Auteur* filmmakers, such as Luhrmann and Godard, have played with this type of D3D. They have allowed the audience to connect with images, with the actors and objects. As well they have denied audiences this type of connection. In general, D3D has diversified to include many variations of film aesthetic.

Commercial Affordances

The primary function of D3D in Hollywood has been to link its creation of visual depth with forms of narrative complexity, such as the trend toward larger and more detailed story worlds. This link attempts to satisfy the industry's economic needs as well as the market's aesthetic need. Narrative complexity is a key element of scholar Henry Jenkins's (2006) argument in *Convergence Culture:*

Where Old and New Media Collide, particularly in relation to *The Matrix* franchise (p. 114). At one point in his analysis, Jenkins (2006) quotes an unnamed Hollywood screenwriter who explains the development of narrative complexity:

> When I first started, you would pitch a story because without a good story, you didn't really have a film. Later, once sequels started to take off, you pitched a character because a good character could support multiple stories. And now, you pitch a world because a world can support multiple characters and multiple stories across multiple media (p. 116).

For Jenkins (2006), this first-hand account of 'world-building' adoption illustrates Hollywood's intention to invite its audience to explore story information more deeply, to 'bring what we find there to bear on contemporary media' (p. 122). As well, it points toward the economic value of narrative complexity, where multiple media are incorporated and sold to achieve a profit objective. Jenkins (2006) refers to this aspect of narrative complexity as 'world-making' (pp. 113 – 122).

'World-making', also commonly referred to as 'world-building', is a term used in Bordwell's (2006) analysis of contemporary Hollywood production in *The Way Hollywood Tells It*. Bordwell defines 'world-making' as '[a setting that offers] a rich, fully furnished ambience for the action' (p. 58).[19] It is seen in the 'casually inserted props donated by the likes of Bell Telephone, the Defence Department, and General Dynamics' in Stanley Kubrick's *2001: A Space Odyssey* (1968) or in the use of real *Washington Post* garbage in *All the President's Men* (1976; p. 58). In this way, 'world-making' is a form of filmmaking expression. As well, it acts as a knowing wink, a form of positive feedback to fans which encourages them to continue to delve deeper into the narrative: to engage in the story, its characters and its world.

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[19] Kristin Thompson (2007), in *The Frodo Franchise:* The Lord of the Rings *and Modern Hollywood*, refers to "worldmaking' as 'overdesign' (p. 95). Overdesign, she says, features several times in *The Frodo Franchise* and the *LOTR* trilogy, none more humorous than the Balin's Tomb scene featuring chiselled Dwarvish script. These inscriptions, primarily intended as evidence of the history of the Dwarvish people in the Mines of Moria and Middle Earth, have been scrutinised by a group of avid fans, who say the phrase 'Made in New Zealand' is included on the walls of the tomb.

Bordwell makes his case about 'world-making' within a broader argument about contemporary Hollywood visual style in *The Way Hollywood Tells It*. It is here that he extends ideas about classical Hollywood cinema to contemporary Hollywood, with the identification of a new, contemporary visual style (pp. 115 – 189). Bordwell calls this contemporary version of classical Hollywood visual style, 'intensified continuity'. He argues that:

> Far from rejecting traditional continuity in the name of fragmentation and incoherence, the new style amounts to an *intensification* of established techniques. Intensified continuity is traditional continuity amped up, raised to a higher pitch of emphasis. It is the dominant style of American mass-audience films today (p. 120).

In other words, the pace and dynamism of classical continuity are increased, amplified. This new style typically uses prowling cameras, is cut faster, cuts between short and long lens lengths, and has a reliance on close-up shots. The identification of intensified continuity is explained in the context of franchise and Hollywood *auteur* productions, such as Peter Jackson's *The Lord of the Rings* trilogy (2001 – 2003) and John McTiernan's remake of *The Thomas Crown Affair* (1999). In the latter example, Bordwell compares and contrasts McTiernan's film with Norman Jewison's 1968 original in order to illustrate the key continuities and changes in visual style (pp. 130 – 133). The factors that are listed as being responsible for developing 'intensified continuity' include television and the trend in Hollywood filmmaking toward virtuoso, *auteur* direction. Faster cutting is related to television. In *Film Art: An Introduction*, Bordwell explains this response in terms of particular developments in film history:

> Movies were broadcast by TV networks in the 1960s, transmitted by cable and satellite in the 1970s, and available on home video in the 1980s and 1990s. As people saw movies on home screens rather than in theatres, filmmakers reshaped their techniques. Constantly changing the image by cutting and camera movement could keep the viewer from switching channels or picking up a magazine. On smaller screens, faster cutting is easier to follow, and closer views look better than long shots, which tend to lose detail. Intensified continuity was shaped by many factors, such as the arrival of computer-

based editing, but television was a major influence
(Bordwell & Thompson, 2008, p. 246).

In this way, the style of Hollywood production naturally followed the needs of the television industry and audience; hence, faster cutting. In general, this is the stylistic context that 'world-making' and D3D are produced in.

Elsaesser points out that the combination of visual depth with narrative complexity and detail aligns with the industry's trend toward 'franchise movies, merchandising, [and] themed entertainment' to combat the threat of the internet's business model. 'World-making' provides the context for D3D to be integrated across multiple media and multiple sites of content production, including movies, digital games, television, and so on. For stereoscopy status, this marks a significant shift: rather than being connected to largely B-movie production and genres, such as horror, science-fiction, and Westerns, as was largely the case in the 1950s boom period, the connection with franchise productions means that it is also integrated into A-movie productions, including literary adaptations, such as *The Great Gatsby*. In return, D3D provides Hollywood with a key point of difference, one that it uses to advertise its products on the big screen, or rather a big 'marquee and billboard' (Elsaesser, 2013, p. 223).

In particular, this combination relates to fan investment. According to Shilo McClean's (2010) essay, 'The Digital Playing Fields: New Rulz for Film, Art and Performance', fans typically invest in an entertainment by '[weaving the narrative] into the fabric of [their] identity' (p. 16). [20] This investment often

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[20] This is not to say fans do not understand the distance there is between their enjoyment and the creative and industrial processes of content creation. In fact, as Jenkins (1992) notes in *Textual Poachers: Television Fans & Participatory Culture*, fans remain 'acutely and painfully aware that those fictions do not belong to them and that someone else has the power to do things to those characters that are in direct contradiction to the fans' own cultural interests' (p. 24). In addition, many fans have expressed ownership in terms of 'textual poaching', a form of narrative ownership that positions the fan alongside the narrative's creators in building the world – an example of media as a 'top-down corporate-driven process and a bottom-up consumer-driven process' (Jenkins, 2006). Textual poaching has broadened as a pastime alongside the growth of the internet. Fans are now able to produce and distribute material much more easily than before, be it fan fiction, re-enactments, wikis, websites, blogs, videos, cosplay photos and even character Twitter feeds (Rose, 2011). Kristin Thompson (2007) in *The Frodo Franchise* notes that as of 9 January 2006, 38, 806 *Rings*-related fan fiction posts had been

manifests as a physical ownership of a t-shirt, a character figurine, a Blu-ray disc or a poster. A commonly cited example of fan ownership is the *Star Wars* franchise. Bordwell (2006), for instance, uses the example to illustrate the economic potential of 'world-making':

> *Star Wars* (1977) signalled the marketing potential of massive detailing. Lucas remarked in 1977 that inventing everything from scratch – clothes, silverware, customs – created a "multi-layer reality" … Lucas, who published a comic book and a novelisation of *Star Wars* before the film was released, understood immediately that cross-media world-making was one way to extend the studio idea of a B-series. Audiences who had visited Disneyland and had seen comic-book characters become TV heroes were ready to enter a self-contained universe straddling many media (p. 59).

The detailed story world coincided with fan engagement which maximised the franchise's profit. A more recent example is director James Cameron's D3D film franchise, *Avatar*, which includes an original ecological system, with distinctive flora and fauna, and a unique native culture. In Frank Rose's (2011) discussion of *Avatar* with Cameron, for example, the director states that his intention was to, like Lucas, create a film with a 'fractal-like complexity' (p. 49).[21] He gets to the core of this intention by saying that:

> The casual viewer can enjoy [*Avatar*] without having to drill down to the secondary and tertiary levels of detail. But for a real fan, you go in an order of magnitude and, *boom!* There's a whole set of new patterns. You can step in in powers of ten as many times as you want, and it still holds up. But you don't need to know all that stuff to enjoy it – it's just there if you want it (p. 49).

The 'real fan', the one who spends time with the film and invests in understanding the various levels of detail, is prompted to adopt the film's detail as a part of their own personality via franchise products, such as digital games

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made to fanfiction.net – the number, as of 17 May 2012, totals 46,351, which, to put it in context is approximately 546,989 entries behind *Harry Potter*.

[21] It should be noted that rather than use the term 'fractal' with reference to Wendy Everett's (2005) 'fractal films', that is, films 'structured as a series of apparently unrelated stories that intersect and interact with each other in random, unstable, and unpredictable ways' (p. 160), Cameron uses the term to illustrate the infinite layers of detail and depth in a film.

(*James Cameron's Avatar: The Game* [2009]), books (*Avatar: A Confidential Report on the Biological and Social History of Pandora* [2009] and *The Making of Avatar* [2010]), and a theme park attraction (which, in the case of *Avatar*, is still to be completed). For Elsaesser (2011), in the essay, 'James Cameron's *Avatar*: access for all', the 'doing' action that D3D prompts is likely to motivate audiences into this investment:

> As far as Hollywood is concerned, it wants audiences to *interact* with images, while Hollywood itself *acts with the images*. Which is to say, for the industry that makes them, images are instructions for actions – they trigger further moves, purchases and events – rather than pictures to contemplate or immerse yourself in … (p. 260).

That is, the 'doing' action corresponds to the participation in active commercial exchange between audience and intellectual property.

In this context, the D3D films of Hollywood *auteurs*, such as Cameron, Martin Scorsese, Baz Luhrmann, Ang Lee, Francis Ford Coppola, Tim Burton, Robert Zemeckis, and Steven Spielberg, have an implicit commercial function (Elsaesser, 2012, p. 282). They satisfy the market's aesthetic need via an appreciated visual style, which includes the mastery of stereoscopy and digital production (p. 281). As well, they satisfy the industry's economic need by continuing the characteristics and ideas of Hollywood's business system, and by accommodating the diversification of the digital screen period media landscape. In other words, they are able to express a personal vision on film while maintaining a close relationship with the media corporation that owns the Hollywood studio (p. 281).

These characteristics reflect a different attitude to filmmaking in the digital screen period, one that is concerned with pursuing a 'signature style' and a 'signature product' (pp. 282 – 285). In this context, Elsaesser argues that the term, *auteur*, should be refined to reflect this attitude. That is:

> [W]hen thinking about authorship today, it is not a matter of pitting art against commerce, critical acclaim against box-office figures, or conversely, asking rhetorically

whether the arts have ever flourished without either
patronage or a "market" (p. 282).

 The term he chooses to reflect this change is post-*auteur*, which is defined by
notions of creative expression to do with personal artistic visions, and
managerial and financial expertise. For post-*auteur* filmmakers, aesthetic and
economic needs do not necessarily compete, as identified as a critical factor of
the 1950s stereoscopy period, but work in relation to the other.

        In this way, Elsaesser's identification of post-*auteur* provides further
context to the digital screen period and D3D uptake. It shows, for instance, that,
rather than retrace each plotted step of the canonical story, D3D has been
adopted into new contexts which suggest further possibilities of commercial,
industrial, aesthetic exploration and significance. These new contexts reflect
forms of continuity that connect D3D with previous periods. They also reflect
significant changes, where lines of cause and influence may or may not
converge, resulting in different outcomes. The competing notions that cast
stereoscopy in popular criticism as a technology that inevitably fails, as in the
canonical story, or as one that will eventually come to dominate the film
industry are 'deterministically reductive' (Gurevitch & Ross, 2013, p. 92). In
general, D3D may be adopted and later rejected in particular instances while in
other instances it is taken up and sustained.

DIRECTIONS, FOCUS AND APPROACH OF THE STUDY

The variety of ways that D3D is adopted and integrated, and either satisfies or
dissatisfies the economic and aesthetic needs of the industry and the market,
shapes the particular approach to D3D research. It highlights a particular
framework that relates to the inter-related factors of screen technology,
commerce and art. These factors contextualise the problems, issues and ideas
about D3D, such as, the uptake of D3D technology, the convergence of stylistic
devices, narrative and industry trends to do with mode of production, and so on.
They provide detail that helps us understand the significance of cinematic
stereoscopy in the digital screen period.

The prominent film scholars included in the literature review have similarly constructed arguments using the framework of screen technology, commerce and art before. Most have used a mixture of qualitative and quantitative methodologies. Thomas Elsaesser (2012), in *The Persistence of Hollywood*, for example, draws on qualitative methodology to analyse and extend the notion of *auteur* production in regard to the technological- and economic-oriented Hollywood cinema. This work includes several case studies, including James Cameron (pp. 29 – 62, 159 – 173, 281 – 304). Edward Buscombe (1985), in 'Sound and Color', employs a mixture of economic theory and historical, empirical evidence to explore the ways that technology, business, and aesthetic shaped Hollywood's adoption of colour and sound (pp. 83 – 92). John Belton (2013), in *American Cinema/American Culture*, as well as in sections of *Widescreen World*, combines elements of cultural studies, new historicism, and film theory to define the basic technology, business and aesthetic features of American cinema. As well, David Bordwell (1985, pp. 1 – 72; 2006, pp. 121 – 189), in *The Classical Hollywood Cinema* and *The Way Hollywood Tells It*, uses a mixture of qualitative and quantitative methodology to illustrate western film styles, namely classical Hollywood continuity and intensified continuity. In each case, the framework of technology, commerce and art is explored via a mix of methodologies.

This thesis builds upon the work of Elsaesser, Buscombe, Belton, and Bordwell by using a similar framework and mix of methodologies to explore its subject, digital screen period stereoscopy. The analysis of particular historical trends and the various factors investigated in approaches to studying stereoscopy, undertaken in the literature review, is continued in the following chapters. These chapters are characterised by an approach to studying D3D that uses quantitative analysis to test claims derived from qualitative analysis.

A Mix of Methodology: Qualitative and Quantitative

The combination of qualitative and quantitative methodology illuminates several areas of D3D. In particular the mix helps to show the ways that D3D has been integrated into film productions and the effect that its integration has had on filmmaker use of visual technique and visual style. Technique and visual style

play key roles in Elsaesser's *auteur* argument, Buscombe's analysis of the adoption of colour film, and Belton's argument about formal systems of technique. They also play key role in Barry Salt's quantitative analysis of film production. In this thesis, the significance of stereoscopy in the digital screen period is illustrated by examples of visual technique and style.

Bordwell (2005), in his approach to analysing film aesthetics, has described in several of his published works the reason why analysing technique and visual style is important. In *Figures Traced in Light*, for example, he argues that:

> Style is the tangible texture of the film, the perceptual surface we encounter as we watch and listen, and that surface is our point of departure in moving to plot, theme, feeling – everything else that matters to us. And since filmmakers devote painstaking care to fine points of style, we must dig into details. A comprehensive discussion of any film can't stop only with style, but style should claim a lot of our attention (p. 32).

Here, as in others, visual style is argued to be important in relation to the individual production as well as being representative of broader contextual factors. Comparing and contrasting characteristics of visual style helps to illustrate some of the similarities and differences between conventional and stereoscopy, diverse stereoscopic productions, and different films in a filmmaker's career. This is an approach that Bordwell uses in several instances.

For example, in *Figures* Bordwell discusses the techniques and visual styles of four international *auteur* directors (Louis Feuillade, Kenji Mizoguchi, Theo Angelopoulos, and Hou Hsiao-hsien). He positions these techniques and visual styles in contrast to his work on Hollywood continuity style, including the main industrial, economic and technological contextual factors. In particular, this contrast is achieved in regard to intensified continuity style, which he defines in *The Way* as patterns of contemporary technique use, such as 'rapid editing, bipolar extremes of lens lengths, reliance on close shots, and wide-ranging camera movements' (2006, p. 121). These are techniques in addition to notable classical Hollywood continuity techniques, such as story causality and

motivation, and devices, such as match editing, the 180-degree rule, three-point lighting, and so on, which collectively disguise production artifice. So, having defined Hollywood style in terms classic and intensified continuity styles, Bordwell illustrates various alternatives to these styles in *Figures* via contrast: for example, instead of 'rapid editing', his discussion focuses on each of the four directors use of long-take and staging techniques. This approach illustrates significant characteristics of the work by the four *auteur* filmmakers. It contributes formal observations that explain the various forms of their visual expression.

This thesis carries on this tradition of technique and visual style analysis. It does so by adopting and integrating Bordwell's approach to study D3D. The thesis supports this approach by adopting and integrating Barry Salt's 'practical film theory' quantitative approach. Salt's approach extends and supports the direction of Bordwell's largely qualitative work; in fact, Bordwell cites Salt on a number of occasions in *The Way* (2006, p. 173) and on his blog, which is shared with Kristin Thompson, *Observations on Film Art* (2007). For Salt (1983), like Bordwell, studying technique and visual style is also a means of exploring individual filmmaker aesthetic as well as the broader issues, problems and ideas concerning 'the more general influence of society and culture' (p. 23).

In much the same way as in Bordwell's classical Hollywood continuity system of levels, which is outlined above, Salt considers the creation of films as occurring on several levels (or rather orders of effect). The first level of analysis concerns film devices and techniques, such as shot length, shot size, camera movement, and so on. The second concerns genre and style, which is formed 'after this primary analysis [on the first level] has been carried out' (Salt, 1983, p. 24). An assessment of visual style is then derived from comparative analysis, that is:

> when we consider films in relation to other films. If analysis along the lines [of number of shots, shot lengths, shot size and movement] has been carried out, then the distributions of these quantities (shot length, etc.) for a particular group of films, say by a particular director, when compared with those for other directors working at the

same place and time, give a sure indication of the existence
of a personal style (pp. 24 – 25).

In this way, Salt's (2006) method of film analysis, his 'practical film theory',
works by breaking a film down into its most basic structural parts (p. 14). As
noted earlier, it is a process of reverse-engineering the production process.
These parts include the length of a shot and average shot length (ASL); the size
of a shot, such as Big Close-Up (BCU), Close-Up (CU), Medium Close-Up
(MCU), Medium Shot (MS), Medium Long Shot (MLS), Full Shot (FS), Long
Shot (LS); the movement of the camera during a shot, such as pans, tilts and
tracking movements. When the analysis is completed, data are situated in
context of film production, leading to conclusions about visual style, such as the
relationship between screen technology, technique and visual style, as well as
about broader issues of film, including visual style trends. As one might suspect
from the title of one of his books, *Film Style and Technology: History and
Analysis*, this context is made up of a combination of developments in screen
technology and social forces, which Salt relates to the development and
formation of aesthetic production.

Salt has defined his methodology and method in articles for *Sight and
Sound* (1974, pp. 108 – 109) and *Journal of Media Practice 2* (2001, pp. 97 –
114), and in two books, *Film Style and Technology: History and Analysis* (1983,
pp. 30 – 39) and *Moving Into Pictures* (2006, pp. 14 – 15). In each instance, his
goal of an objective study of film is explained, one that recalls the objective
approaches to studying science. According to Salt (1983):

> The serious study of the cinema should strive towards,
> without being able to attain, the nature of the established
> sciences such as biology and physics, which are identical in
> England and Russia, America and China. Film studies are
> unable completely to become a real science because of the
> essentially innovatory, idiosyncratic, and complex nature
> of the art object. There are no eternal laws of aesthetics (p.
> 33).

In this way, Salt is attempting, via practical film theory's quantitative, objective
approach, to observe and understand the changes in film. He argues that his
method moves the discussion beyond verbal descriptions of a screen

technology's impact on modes of production or a filmmaker's work toward a more precise explanation of how processes of filmmaking work (p. 171). It is motivated by precision:

> Up to the present, everyone has been satisfied with statements like "… Fritz Lang, like Jean Renoir, puts the emphasis on Long Shots in his films …", and "*Muriel* (1963) contains twice as many shots as the average film", or even vaguer statements to describe a director's style. When concrete statements like the above *are* made in this area, they often turn out to be flatly wrong, as indeed are those I have just quoted. In fact *Muriel* contains a fairly average number of shots, and both Lang and Renoir worked mostly with a camera distance of around Medium Shot (p. 171).

In sum, Salt's quantitative method of analysis produces logical conclusions that are based on objective data, thereby avoiding vague and opinion-based statements. In support of a qualitative approach, such as Bordwell's, the quantitative analysis strengthens the overall approach to film study, providing objective detail to broader arguments about film.

Practical Film Theory: 1950s Stereoscopic Production

An example of Salt's method, and 1950s stereoscopic production, helps to illustrate the value of the quantitative approach. It also helps to explain how 1950s stereoscopic production is similar and also different to the period's conventional production. In this way, it provides data that answer a range of questions regarding technique and visual style trends. For example, 'What did the emphasis on the spatial system do to classical continuity editing?' 'Does positive-parallax make it harder to make short cuts?' 'How are negative-parallax images integrated into a film, and are they used at all?' 'What does stereoscopy do to a scene's staging?' 'Does it extend the field of action or condense it?' 'What does it do to the types of camera shots?' 'Are there more point-of-view shots in stereoscopic films than in conventional films?'

The original analysis of 1950s stereoscopy corresponds to Salt's (1983) own analysis of 1950s Hollywood production in *Film Style & Technology*, which reiterates the notion that Hollywood industry adopted screen technologies in

response to the market's adjustment (p. 309). However, rather than focusing on stereoscopy, which he only briefly discusses, Salt's analysis primarily discusses widescreen technology, CinemaScope, which he argues led to the uptake of longer shot lengths in the period. That is:

> If we consider a group of 21 CinemaScope films made between 1952 and 1957, we find that their mean Average Shot Length is 13 seconds, whereas in the same six year period a fairly random sample of about 100 films of all kinds has a mean A.S.L. of 11 seconds [or more precisely, 10.13 seconds. Salt, 2006: 333]. So it seems there *was* a small tendency for 'Scope films to have longer takes, and particularly so in 1953-54, if we look at the results in detail (p. 317).

This argument attempts to demonstrate that the idea that the adopted widescreen technology increased the length of shots by approximately two seconds (or, more precisely, by 2.87 seconds). Stereoscopy's relationship to CinemaScope in the period prompts similar questions about its impact on technique and visual style.

Adopting Salt's quantitative method and his sample size (of 21 stereoscopic films) helps to provide data to analyse 1950s stereoscopy period. Like Salt's work, this analysis similarly reverse engineers the editing process to illustrate the impact that a screen technology had on cutting rates. However, instead of Salt's manual process of counting shots, the free online software, Cinemetrics (created by Gunars Civjans and Yuri Tsivian),[22] is adopted; which is to point out that since 1983 digital technologies have developed which aid analysis. Cinemetrics has two interfaces that allow the user to count shots and calculate the average shot lengths, and also to count the types of shots (see figures 1.4 and 1.5).

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[22] The Cinemetrics program includes a basic interface that can be customised to suit particular data collection. Once the program is installed it is a simple matter of synchronising the program with the film or specific film scene that is to be analysed. This is easily achieved via a laptop computer and a 3D television and Blu-ray player system. Once collected, data remain raw until further work is completed.
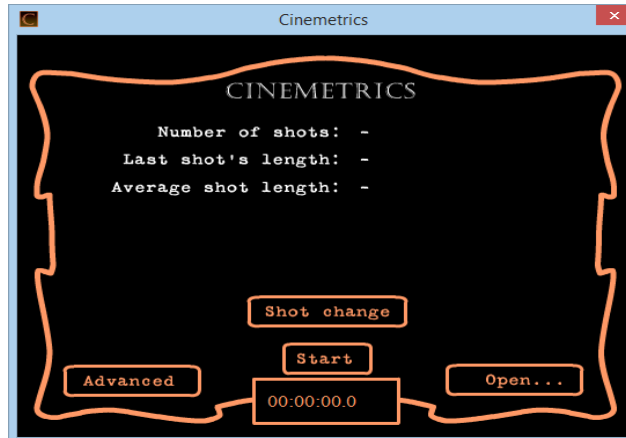
1.4: The simple Cinemetrics interface.
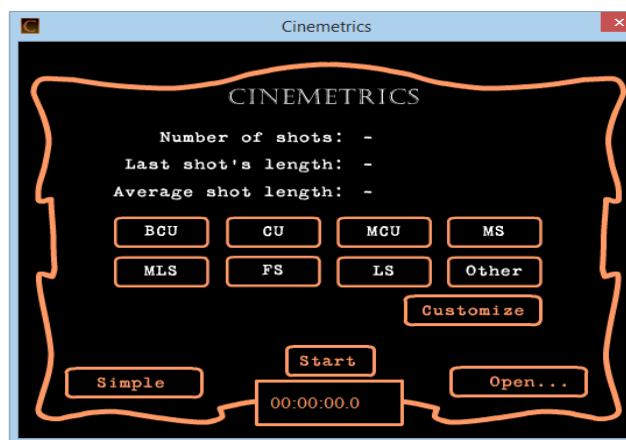
1.5: The advanced Cinemetrics interface.

For the analysis of the stereoscopic films only the simple interface is needed to calculate the average shot lengths. The results from this analysis are listed in figure 1.6. Once each film is analysed, a mean average shot length figure is calculated. This is a simple mathematical process that is achieved by adding the total ASL number of the sample group together and dividing this figure by the number of the sample group. In the case of the 21 1950s stereoscopic films, the mean average shot length is 8.85 seconds (185.9 divided by 21 equals 8.85).
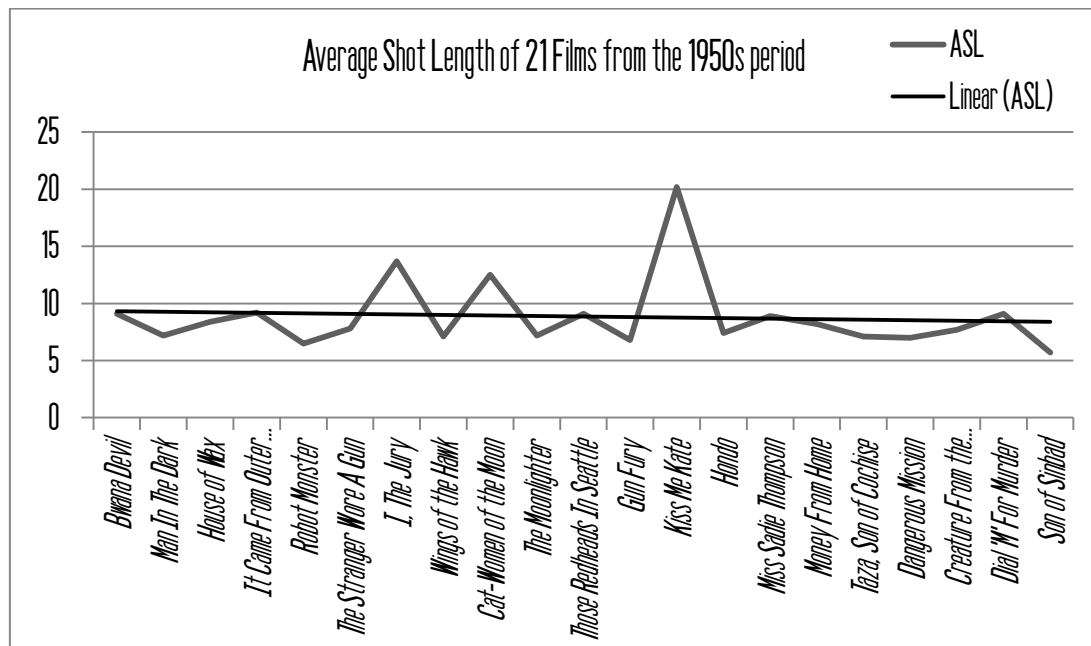
Average Shot Length of 21 Stereoscopic Films from the 1950s period			
Film	Year	ASL	Director
Bwana Devil	1952	9.1	Arch Oboler
Man In The Dark	1953	7.2	Lew Landers
House of Wax	1953	8.4	André de Toth
It Came From Outer Space	1953	9.2	Jack Arnold

Robot Monster	1953	6.5	Phil Tucker
The Stranger Wore A Gun	1953	7.8	André de Toth
I, The Jury	1953	13.7	Harry Essex
Wings of the Hawk	1953	7.1	Budd Boetticher
Cat-Women of the Moon	1953	12.5	Arthur Hilton
The Moonlighter	1953	7.2	Roy Rowland
Those Redheads In Seattle	1953	9.1	Lewis Foster
Gun Fury	1953	6.8	Raoul Walsh
Kiss Me Kate	1953	20.2	George Sidney
Hondo	1953	7.4	John Farrow
Miss Sadie Thompson	1953	8.9	Curtis Bernhardt
Money From Home	1953	8.2	George Marshall
Taza, Son of Cochise	1954	7.1	Douglas Sirk
Dangerous Mission	1954	7	Louis King
Creature From the Black Lagoon	1954	7.7	Jack Arnold
Dial 'M' For Murder	1954	9.1	Alfred Hitchcock
Son of Sinbad	1955	5.7	Ted Tatzlaff

1.6. Average shot length of 21 stereoscopic films from the 1950s period.

This figure provides significant contrast to Salt's figures for the shot lengths of the period (11 seconds) and CinemaScope (13 seconds). It shows that stereoscopic films are cut considerably faster than either of these two sample groups: 1.28 seconds faster than the overall figure for the period and 4.15 seconds faster than CinemaScope films. In fact, most stereoscopic films, with the exception of *I, the Jury*, *Cat-Women of the Moon* and *Kiss Me Kate*, have lower ASLs than the mean average for the period (10.13 seconds). *Son of Sinbad*, for example, almost halves the period's overall cutting rate. In short, rather than increase the length of shots, as in Salt's analysis of CinemaScope was found to do, stereoscopy in the 1950s had little impact on the downward trend in cutting rates (see figure 1.7). In terms of the following chapters, in particular Chapters Two and Four, Salt's method of analysis is significant. It

corresponds with qualitative approaches and illustrates further detail about screen technologies, such as their adoption and impact on aesthetic production.

1.7. Average shot length of 21 stereoscopic films from the 1950s period.

Salt's method is also useful in demonstrating a filmmaker's relationship to a technology. It illustrates how a filmmaker's stereoscopic production, such as that of Alfred Hitchcock or Douglas Sirk, is similar or different to their conventionally produced films. In other words, the method of analysis also supports the study of *auteur* (or rather post-*auteur*, in the case of the digital screen period) filmmakers, in particular illustrating an *auteur* filmmaker's relationship to screen technology. This is a connection Salt makes in *Film Style and Technology*, although he strives to make clear a fundamental difference in his approach and the approaches of others in relation to *auteur* theory. Salt (1983) argues, for example, that Andrew Sarris' use of *auteur* theory is inconsistently applied in criticism of particular directors, such as in the case of Sarris' criticism of Billy Wilder (p. 6). The basis of this inconsistency, Salt contends, is essentially 'an unconscious desire to justify personal preferences' (p. 33). These personal preferences mean that one filmmaker is elevated above other filmmakers, despite the commonalities of mode of production, and artistry of technique and visual style. The objective approach of Salt's method of analysis means that the effect of personal preferences on the analysis is reduced.

Objects of Study

As one might expect, the selection of objects of study primarily concerns D3D films. These reflect the digital screen period, and are a reflection on the film industry's large scale use of D3D technology. Along with film, the thesis also refers to and analyses the use of D3D in television and digital games, though these are typically used in relation to film production, such as in franchise productions. Screen productions were also selected because they are commercially-produced, and accessible to the Australian public via cinema theatres, entertainment stores, including rental and download stores, libraries and broadcasts. In all, more than 140 productions have been analysed for the thesis.

The scope and detail of analysis of these productions varies. Most have been selected in order to draw out particular characteristics of D3D visual technique and style. In Chapter Two, for example, 75 productions are analysed to show average shot lengths (ASLs) of digital screen period D3D films. These ASLs are discussed in relation to published research on conventional ASL figures. As a result, the selection of films and the data from analysis helps to define D3D technique and illustrate whether or not D3D uptake has disrupted filmmaking trends. The large sample size reflects an attempt to compare and contrast D3D data with conventional data. Some selections form smaller samples. These productions are discussed and analysed in greater detail, and either develop a case regarding a filmmaker's visual style over a career of feature film work or define a sub-genre's prominent characteristics. In Chapter Three, for example, director, Baz Luhrmann's four conventionally produced feature films (*Strictly Ballroom* [1992], *William Shakespeare's Romeo + Juliet* [1996], *Moulin Rouge!* [2001] and *Australia* [2008]) are compared and contrasted briefly to his D3D film, *The Great Gatsby* (2013). In Chapter Four, films are grouped into sub-genres of documentary (event films, IMAX and cinematic feature documentary), which illustrate particular visual technique and style trends to do with the sub-genre as well as the uptake of D3D by documentary filmmakers. In general, the variations in scope and detail reflect the qualitative argument about digital screen period stereoscopy.

A caveat to these selections is the inclusion, where necessary, of productions from outside of the digital screen period, such as a selection from the 1950s period. This is motivated by the attempt to compare and contrast objects from one period to another. In this way, analysing older stereoscopic films as well as D3D films helps to build an understanding of digital screen period, in particular the relationship between D3D technology and visual technique and visual style.

A factor in the selection of the objects of study for the thesis is that while D3D is available at multiplex cinemas, other avenues of finding D3D productions, such as Blu-ray discs and broadcasts of films and television programs, are limited and sometimes difficult to find. These difficulties are particularly apparent for 1950s stereoscopic production, where films are typically unavailable or have limited availability. This is a barrier to analysing stereoscopic content, a process that often includes using slow-motion playback in order to scrutinise particular elements of production. One of the main reasons for this limited availability relates to the fact that stereoscopic production has not to this point been integrated successfully into content delivery pathways. It continues, for instance, to be shelved in smaller, separately partitioned sections at most retail stores and limited to the most popular titles, as if to reiterate their unique appearance in store. At the same time there are quality issues regarding downloaded content. Another reason is the necessity to access stereoscopic capable hardware, such as a 3-D Blu-ray player and a 3-D television.[23] Conventional hardware is not capable of screening stereoscopic content. This means that in order to study stereoscopy, reliable access to these technologies is needed. And, while these technologies are becoming more common, 3-D players and 3-D televisions nevertheless amount to further costs that are prohibitive for institutional cataloguing, such as libraries or retail rental, or prohibitive for personal use.

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[23] David Bordwell has similarly discussed this problem. In his blog post about Godard's film *Adieu to Langage*, Bordwell (2014) says that he and Kristin Thompson's needed to purchase a television and Blu-ray player in order to view and study stereoscopic films. Miriam Ross (2014) also makes several references to viewing stereoscopic films, on her blog, *miriamruthross: Cinema Lives Cinema Lovers*.

Among the selection of D3D films is a bias toward Australian productions in Chapters Three and Four. These chapters employ the Australian national film industry as a major context for focusing on examples of D3D production in relation to funding policy, business practice, and creative approaches to screen technology. The date of Australia's D3D film releases reflects the fact that the national industry's involvement in stereoscopic production only occurs in the digital screen period; that is, Australia is an example of a national cinema that defines many of the themes, characteristics and developments of stereoscopy in the digital screen period with reference to international issues, problems and ideas. D3D production has grown considerably in Australia. Where once stereoscopy was limited to a lenticular 3D television system (created by Phillip Adams and Volk Mol, and funded by Kerry Packer during the 1980s), the country now boasts six feature films, and a sizeable list of foreign titles that source production expertise from local companies, such as Rising Sun Pictures, Animal Logic and Illoura (Adams, 2010, p. 6). Australian films, including *Cane Toads*, *Storm Surfers*, as well as Baz Luhrmann's *The Great Gatsby*, are used as key examples to explore D3D. These productions are a way to highlight and develop particular points of the broader argument, including screen technology uptake, funding structures, and distribution and exhibition channels.

In addition to statistical-based content analysis, interviews with filmmakers were also conducted. These were approved by UNE's Human Research Ethics Committee (approval no. HE11/193) and consisted of four interviews focusing on two particular D3D films, *Cane Toads: The Conquest* and *Storm Surfers 3D*. It is the experience of this researcher that the members of the documentary filmmaking community are more approachable and more likely to discuss a respective film's topics and filmmaking processes than dramatic feature filmmakers. This is one reason that interview content in this thesis is restricted to the discussion of D3D documentaries. Another reason relates to a thematic choice, whereby the analysis of documentary reflects the investigative mode of production that documentaries typically incorporate, such as interviews. The direction of these interviews bring out the key themes of the study to do with screen technology, aesthetic production, and industrial processes in the Australian context (see Appendix C). In particular they give

insight into the ways that D3D documentaries are funded and developed in the early stages of production; how technologies are taken up and developed to suit principal production environments and aesthetic intentions; and the various distribution and exhibition pathways for documentary, including theatrical, television and online.

Screen Shots

Where possible image stills have been used to help illustrate particular points. These have been sourced directly from the films themselves and re-sized for the page. In general, these have been taken from conventional editions of films so that the image does not appear blurred or discoloured or require anaglyph or polarised glasses to view correctly. Sourcing images from conventional films is also a matter of convenience. It has the added benefit of not disrupting the flow or the detail of the argument (although using stereoscopic stills was considered during the thesis's production). Below these screen shot images, a short caption is presented. These typically carry notes on or extend a particular point of the argument. The image and the note work in tandem, each part combining to make a whole.

CHAPTER CONCLUSION

Literature Review and Methodology has drawn out particular themes to do with screen technology adoption and integration which relate to the commercial needs of the film industry and the aesthetic needs of the audience. These themes are inter-related, and broadly inform the methodological approach of the thesis. This framework is adopted in the following chapters to guide the analysis of D3D and its relationship to visual techniques and visual style.

In general, these themes have led scholars to conclude that stereoscopy does not suit or cannot adhere to the principles of mainstream film. These ideas correspond to a canonical story of stereoscopy, which is largely a reflection of previous production periods, most notably the 1950s period. However, as Thomas Elsaesser argues, it is difficult to judge stereoscopy in the digital screen period solely on the same grounds as previous periods. Stereoscopic technology

has diverse uptake by industry and film artists, and various affordances for economic and aesthetic production in the digital screen period. This distinction means that D3D may reflect elements of the canonical story while also exhibiting many other counter-narratives. Multiple lines of cause and influence may or may not fully meet up in digital screen period stereoscopy and so may lead to the screen technology having a more chequered fortune, as in the canonical story, or being taken up and sustained with mainstream use.

To analyse the significance of stereoscopy in the digital screen period, qualitative and quantitative methodologies are adopted and integrated. Works cited in the literature review have presented these approaches in various forms. In the following chapters qualitative methodology is combined with a quantitative approach as a way to look at and objectively define the relationship between D3D technology and visual technique and visual style. This combination is extensively employed in the next chapter, 'Hollywood D3D Style and Form Developments', which focuses on the main characteristics of the relationship between D3D technology, visual technique, visual style and narrative form.

CHAPTER TWO

HOLLYWOOD D3D STYLE AND FORM DEVELOPMENTS

INTRODUCTION

Stereoscopic technology's relationship to visual technique, visual style and narrative form is significant, particularly in regard to sustained uptake in mainstream cinema. It is clear, for instance, when considering Buscombe's discussion of aesthetic need and the analysis of stereoscopy as subverting the classical Hollywood cinema structure, that this long-term industry presence largely depends upon amending the medium's visual style as well as exploring narrative forms other than sex and horror and exploitation (Buscombe, 1985, pp. 87 – 91; Bordwell et al., 1985, pp. 5 – 6; Paul, 1993, pp. 339 – 340). Making these changes notionally means that stereoscopy transitions from novelty to norm (Belton, 1992; 2001). But, 'In what ways does D3D achieve this transition?' 'What are the diverse ways it contributes to cinematic expression?' 'How has the relationship between screen technology, visual technique, visual style and narrative form changed in the digital screen period to achieve this sustained use?'

This chapter considers these questions by analysing the ways that D3D films and filmmakers are exploring visual style, and negotiating a balance between mainstream cinema's narrative system and its spatial system, and so creating complexities of and within various kinds of narrative. The analysis contributes to the aim of exploring the nexus between screen technology and aesthetic production. The chapter attempts to clarify some of the misconceptions regarding D3D visual style, such as the opinion that stereoscopy provokes a slower rate of cutting (Ebert, 2010a; Sandifer, 2011, p. 73). As well, it attempts to situate D3D visual style within a trend in digital media storytelling that focuses on narrative complexity across multiple content sites (Jenkins, 2006). In this way, the chapter shows how the treatment of visual style and narrative form is making stereoscopy significant in the digital screen period.

The development of digital stereoscopic technology is a major factor in the production of visual style, be it during production or post-production phases. To quote director James Cameron (in Cohen, 2008), 'a whole new era of 3-D' is possible because of digital. In this regard, Cameron's view of D3D visual style reflects a pragmatic approach to aesthetic production. For example, he has argued that:

> You can turn the 3-D up or down, and do it smoothly on the fly during a shot. So if you know you're in a scene which will require very fast cuts, you turn the stereo down (reduce the interocular distance) and you can cut fast and smoothly ... Stereo is just another colour to paint with, and the new camera tools allow complete control (para. 26).

In this way, the image and the D3D are malleable materials, able to be turned up or down depending on a filmmaker's vision. What Cameron is arguing is that D3D is actually made up of two, broad visual styles that can now be taken up as a means of complex style and expression.

The idea of a turned down D3D is in fact a rendering of the contemporary stylistic standard. That is, instead of emphasising the dimensionality of D3D, turned down is a conventional depiction of three dimensions which leads to a flatter image. This is a style that is in line with what Bordwell (2006) calls 'intensified continuity'. 'Intensified continuity', as noted in the literature review, refers to the amplification of classical continuity in contemporary cinema.[24] It mixes together characteristics such as wide and long lens lengths, tighter framing, faster cutting rates, and a greater use of camera movement, and it is used to do so in order to punctuate classical Hollywood style with flair and

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[24] Mattius Stork (2012) calls this style, 'chaos cinema': 'chaos cinema directors aren't interested in spatial clarity. It doesn't matter where you are. It barely matters if you know what is happening on screen. The new action films are fast, forward, volatile, an audiovisual warzone'. Meanwhile, Noël Carroll (1998) calls it 'strident stylisation' (p. 261), a phrase re-used in Bordwell's (2006) *The Way Hollywood Tells It* to argue the point that popular cinema production has sought an overwrought style (p. 139). As well, Bruce Isaacs (2015) calls the style 'digital continuity', which builds on research published by Lev Manovich, *The Language of New Media* (2001, p. 322 – 326) and Steven Shaviro, *Post Cinematic Affect* (2010, p. 67). He argues that contemporary action cinema style is an 'expression of an experiential logic' (para. 3) where a number of continuities – not just one denotative continuity – are rendered on screen (para. 7).

flamboyancy, most notably cast in the use of complicated long takes that recall cinema's past masters. For Bordwell, the 'intensified continuity' visual style has permeated most, if not all, popular cinema, including the films of Cameron, whom Bordwell cites along with a number of other prominent *auteur* D3D filmmakers as examples (p. 181). Its prominence in production means that it is representative of mainstream cinema's conventional mode of production. Turned down D3D visual style reflects this mode of production in relation to turned up D3D.

Turned up D3D is a manifestation of the technology's impact on contemporary conventional filmmaking. In turned up D3D, for instance, intensified continuity characteristics continue to be included but are often applied in different ways that lead to different experiences. Long takes, for example, continue to represent a level of virtuosity in D3D filmmaking, but they also correspond to forms of 'ride' cinema that merge theme park aesthetics with positive-parallax stereoscopy; the effect is to compel the audience to look into the image as they would a widescreen image (see figure 2.1; Paul, 1993, p. 339; Abrams in Arroyo, 2000).

2.1: *Journey to the Centre of the Earth*. Enticing the audience to go along for the ride and look *into* the image.

In Cameron's view, the combination of both turned down and turned up styles equates to the broad parameters of a D3D visual style, with the potential to result in diverse and complex aesthetic forms pending variations of filmmaker approach to production. It is a synthesis of conventional and D3D, of continuity and change. In the context of this synthesis, there are three basic areas of image design and film form that provide further detail for investigating D3D devices and techniques, and their relationship to narrative form. The first area is defined in terms of devices that rely on monocular depth cues; which is to say that filmmakers using D3D have trended towards re-emphasising monocular depth cues in order to further support the effects of D3D's key depth controls, namely interaxial distance and convergence. This includes the use of linear perspective compositions, and, to a lesser extent, aerial perspective compositions; fluctuating aspect ratios; and moving particles (sometimes referred to as backscattering).

The second area concerns the technical considerations of D3D image construction. This area relates to the ways that D3D's technical and technological limitations have shaped how filmmakers have approached specific stylistic choices. A common example of a limitation is referred to as a screen window violation. This limitation occurs when an object presented in negative-parallax is positioned on the edge of frame. Part of the object appears to emerge from the screenspace while the other part of the object appears to be cut off. This violation breaks the illusion of a continuous, three dimensional space. As a result, filmmakers have either amended their visual style to avoid problematic framing or they have innovated filmmaking technology and technique. In either case, the filmmakers are provoked into changing their method of production because of the technical considerations of the technology.

The third and final area refers to the context of D3D visual style, specifically the application of specific narrative forms in relation to D3D. These forms serve as metaphor for image depth, such as stories that consider displacement. In these instances, D3D filmmakers go beyond the limited earlier uses, such as narratives constructed around sex and horror and exploitation, in order to explore, with new impetus, ideas concerning actual and virtual realities

(such as, *Avatar*, *Tron: Legacy*, *Ra. One* [2011]), actual reality and fantasy (such as *Alice in Wonderland*, *Gulliver's Travels*, *Hugo*, *Oz the Great and Powerful*, and *Life of Pi*), journeys to alien worlds (*John Carter*, *Journey to the Centre of the Earth* and *Prometheus*), and the distinction between humanity and technology (*Avatar*). In these stories, narrative complexity is used to contextualise visual depth. This arrangement feeds off industry trends toward franchise production and also has ramifications for this production, in particular the application of point-of-difference between franchise products.

Each of the three areas represents the duality of D3D, functioning in relation to a conventional style while also expanding its scope, its menu of stylistic choices. This confluence of conventional and D3D is significant. It illustrates a part of the reason why stereoscopy's reintroduction in the digital screen period is significant.

1). PLUS ONE EQUALS A STRONGER 3(D): MONOSCOPIC DEPTH

Monocular depth cues in D3D play a key role in enticing the audience to look into the image. They collaborate with the stereoscopic controls, interaxial distance and convergence: they provide a stronger illusion of three-dimensional space; they offer a clearer spatial context for D3D to integrate into; and they soften some of D3D's more abrasive features. As a consequence, monocular depth cues have become a key feature in defining D3D's stylistic development.

Among the more notable – and rudimentary – examples of this is the use of classical compositions. The parallel horizontal lines of a linear perspective composition, for example, mimic the converging right and left images of stereoscopy. This composition also plays upon the idea of symmetry in stereoscopy: right and left images projected on screen converging together at a single spatial plane. In linear perspective compositions, relational size, focal depth, and light and shading draw the audience's eyes toward the centre of the frame and a distant point of alignment. Joseph Kosinki's stylised direction of

Tron: Legacy, for example, uses a number of linear perspective compositions.[25] Typically these instances illustrate the journey ahead of the characters, be it in reference to a physical trial, as in figure 2.2, or an emotional journey, as in figure 2.3. Figure 2.3 is also an example of widescreen staging, which sees three characters positioned in a staggered formation so as to distinguish spatial planes (centred so as not to disrupt the image's dominant lines that recede into the horizon as well as to avoid problems with an inevitable pan-and-scan television image reformat).

2.2: *Tron: Legacy*. Sam Flynn faces his fate by entering the games arena. A linear perspective composition (in 2.35:1 aspect ratio).

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[25] Worldwide box-office: US$400,062,763. Released in Australia between 16/12/2010 and 6/2/2011 (52 days and 8 weekends across summer school holidays), box-office totalled US$14,505,106 with a per screen average of US$10,914.

2.3: *Tron: Legacy*: Aboard a 'Solar Sailer', Kevin Flynn meditates on what to do, ultimately combining his digital identity with his actual world identity. A linear perspective composition (in 1.78:1 aspect ratio).

Aerial perspective compositions are also commonly used in D3D production. These compositions emphasise the foreground while at the same time illustrating the scope and depth of the landscape. In *Avatar*, aerial perspective compositions illustrate Cameron's and the crew's attention to x-, y- and z-axes.[26] In figure 2.4 the depiction of depth along the z-axis is accentuated via occlusion, light and shading of each floating rock formation. These rocks, and rock islands, recede into the background, forming planes of depth with each subtle difference in shading. These rock islands are also lined up across the screen in order to highlight the horizontal plane so that the upward angle of the shot and the vine covered cluster of rocks accentuate the image's height.

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[26] Worldwide box-office: US$2,782,275,172. Released in Australia between 17/12/2009 and 23/5/2010, and 26/8/2010 and 5/9/2010 (167 days and 25 weekends across Australian summer and autumn school holidays), box-office totalled US$105,779,507 with a per screen average of US$17,838.

2.4: *Avatar*: The Hallelujah Mountains. An aerial perspective composition that highlights the horizontal landscape as well as the vertical landscape (in 1.78:1 aspect ratio).

In addition to linear perspective and aerial compositions, the choice of aspect ratio (or, as the case may be, ratios) has similarly highlighted the role of monocular depth cues in D3D. Variations in aspect ratio have been used by several D3D filmmakers to craft spatial experiences. *Avatar* was exhibited in either 2.35:1 or 1.78:1. The combination of D3D with the tall 1.78:1 ratio meant that the aerial scenes, as in figure 2.4, offered the audience a particularly effective sense of an elevated point of view and of height (leading to a sense of vertigo [Cameron, 2010]). In director Sam Raimi's *Oz the Great and Powerful* (2013) the ratio transitions from 1.33:1 to 2.35:1 during Oscar Diggs's journey from Kansas to *The Land of Oz*, which references the iconic *Wizard of Oz* (1939) transition from black and white to colour film.[27]

[27] Worldwide box-office: US$493,331,825. Released in Australia between 7/3/2013 and 28/4/2013 (52 days and 8 weekends across autumn school holidays), box-office totalled US$15,877,141 with a per screen average of US$6,882.

2.5: *Life of Pi*: Mimicking the novel's cover design by using the taller 1.37:1 academy ratio.

Director Ang Lee's *Life of Pi* (2012) is another notable example.[28] At times in the film, the ratio fluctuates between 1.85:1 widescreen ratio, which is used for the majority of the film, to taller and wider ratios.[29] In one instance, the taller 1.37:1 academy ratio is used to mimic the dimensions of the novel cover (see figure 2.5; Shawhan, 2012). In another, the film transitions from 1.85:1 to the wider 2.35:1 ratio. This is the more significant of the two examples in terms of monocular depth cues. It takes place midway through the film when the film's protagonist, Pi Patel, is stranded on a lifeboat with the Bengal tiger, Richard Parker. The two are both starving having been stranded at sea for weeks when a school of flying fish are chased directly into their lifeboat's path by a school of larger tuna fish. The switch to 2.35:1 means the image suddenly becomes wider with masked, black bands at the top and the bottom of the screen. The image emphasises the horizontal plane, in particular the active surface of the ocean. As the fish jump, splash and swim toward the camera, parts of the masked area become intermittently occluded by flying fish and the chasing tuna. The fish appear outside of the 2.35:1 framing and in front of the masked area (see figure

[28] Worldwide box-office: US$609,016,565. Released in Australia between 1/1/2013 and 10/3/2013 (70 days and 10 weekends over the Australian summer school holidays) box-office totalled US$28,420,882 with a per screen average of US$8,906.

[29] *Life of Pi* was nominated for Best Editing and awarded the Academy Award for Best Director (Ang Lee), Best Cinematography (Claudio Miranda) and Best Visual Effects (Bill Westenhofer, Guillaume Rocheron, Erik-Jan de Boer and Donald Elliot).

2.6); they 'break the mask' of the screen, which is an effect also employed in other D3D films, such as *G Force* (2008), *Despicable Me* (2010), *Journey to the Centre of the Earth* (see figure 2.7) and *Oz the Great and Powerful* (2013). As a result of the mask break, the fish look as if they are emerging from the screen and into the cinema space, a look that is particularly effective when used in collaboration with the use of negative parallax to highlight the object's incursion into the cinema space.

2.6: *Life of Pi*. A Pacific bluefin tuna fish breaks the 2.35:1 mask when attempting to catch a flying fish.

2.7: *Journey to the Centre of the Earth*. Another example of an object breaking the framing mask. In this instance, an iris (or aspect) shot is used to show an exotic bird occluding the image mask.

Other similar, monocular-based devices offer a further stylisation of the image. This most clearly relates to the use of moving particles (a form of backscattering). Common examples include debris, snow, embers, dust, insects, bubbles, rain or types of hologram displays (see figures 2.8, 2.9 and 2.10). When these particle objects are situated between the camera and image's primary object, such as an actor, building, or a prop, the resulting image has multiple, albeit small, depth cues. They occlude elements of the image; they provide relative size information; and they define space via their movement in relation to other objects. Their effect in D3D films, as Dave Kehr (2010) notes, is to merge visual planes together and create a 'viscous space' where 'the contrast between foreground and background no longer seems quite as harsh and conspicuous … it has all become mid-ground, a continuum closer to the way we actually perceive the world' (p. 67). That is, moving particles provide the impression of volume. As well, they offer opportunities to imbue images with dramatic meaning, such as Baz Luhrmann's use of visual barriers in *The Great Gatsby* to symbolise unattainability, loss and distance.

2.8: *Journey to the Centre of the Earth*. Dandelion seeds moving in the breeze are shown in negative-parallax. The effect connects the audience space to the image, which recedes along the positive z-axis past with the help of occlusion, relative size, and light and shading.
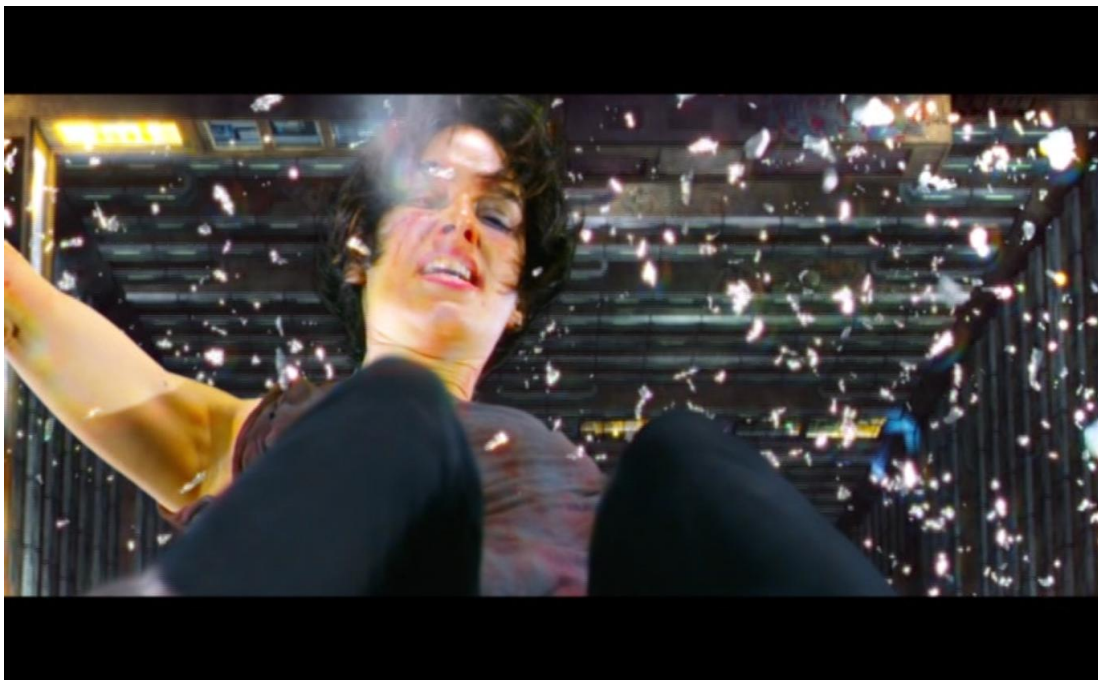
2.9: *Dredd*: Ma-Ma falling out of a window in (and while high on a drug called 'Slo-mo') with shards of glass illustrating the image's spatial volume. The receding lines of the building – in linear perspective composition – complement the use of moving particles.

2.10. *Dredd*: Cause and effect in slow-motion. Ma-Ma's (first-person) perspective of Judge Dredd pushing her out of the window.

Significantly, the use of moving particles has come to represent one of a number of opportunities filmmakers have to subtly extend the z-axis beyond the cinema screen – in contrast to overt examples, such as breaking the image mask. Martin Scorsese's *Hugo*, for example, uses moving particles on a number of occasions.[30] In the film's first tracking shot, an extreme long shot of a winter Paris has snow falling and swirling with the wind. The flakes provide the impression of volume, an impression which is further aided by the initial use in the shot of an aerial perspective composition (see figure 2.11).

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[30] Worldwide box-office: US$185,770,160. Released in Australia between 12/1/2012 and 25/3/2012 (73 days; 11 weekends across the Australian summer school holidays) box-office totalled US$10,813,316 with a per screen average of US$4,788.

2.11: *Hugo*. Snow falls on Paris with the Eiffel Tower and the city's north-west in the background.

In this composition, snow falls towards and past the frame – never falling onto the lens or violating the window – as the camera moves down to the film's key location, the Gare Montparnasse Train Station (see figure 2.12).[31] The effect is two-fold. It provides a moment of stereoscopic virtuosity, recalling the filmmaker's other long takes, such as the Copacabana shot from *Goodfellas* (1990). It also illustrates important contextual information: the audience understands that the story is set in a period of cogs, coal and trains – namely the key early twentieth-century modernity period when stereoscopy was first introduced into film – and that the protagonist's world is a stark and cold place. In terms of depth cues, occlusion, relative size, light and shading, converging lines, and movement are all featured, but the overall emphasis concerns the use of D3D, which is introduced on a broad, city-scaped, scale. In this sense, the monocular depth cues act to support the visually dominant D3D.

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[31] Robert Zemeckis uses a similar shot depicting a wintery 19th century London at the beginning of *A Christmas Carol*.

2.12: *Hugo*. Linear perspective composition: the station's windows, steam, actor staging and train windows define each spatial plane.

In each example the D3D grows out of conventional visual technique and style. Vince Pace (in Hope-Jones, 2012) makes the point that this expansion of visual technique and style is a natural process of integration:

> Too often people are educated about 3-D in a way that
> devalues their previous knowledge, and that's unfortunate,
> because 3-D is elevated by good 2-D techniques and skills
> … Cinematographers have been working with perspective
> and dimension through lighting for a long time – it wasn't
> new with 3-D – and we can only build something great on a
> good foundation (p. 56).

In other words, mono depth devices are the basis for stereo depth devices. The combination of the two is exemplified more clearly by the production of D3D conversion films, which build upon conventional monocular depth cues to clarify the three-dimensional spatial relations between characters, settings and props, and highlight the D3D. In these instances, the stereo depth is quite literally born out of the mono depth.

2). OBSTRUCTIONS

It is not only the use of monocular depth cues that contributes to D3D style. There are also a number of technical obstacles to consider. Window violations

can rupture spatial continuity; misaligned images can cause retinal rivalry and lead to strabismus and other maladies and rupture the immersive effect; and, allegedly, the increased depth information of the image can impact on the time needed by an audience to understand what is happening in a shot and in a scene. In terms of a D3D stylistic menu, these obstacles are a refining force. On the one hand, they become an accepted restriction and are integrated into the filmmaking process and a film's aesthetic, and on the other hand they prompt innovation and essentially cause the stylistic menu to grow.

Both of these reactions to technical obstructions work in relation to window violations. As noted above, window violations occur when a part of an object or character appears on the edge of the frame, that is, in front of the screen plane and on the edge of the screen. In a negative-parallax image, this positioning means that the illusion of a continuous three-dimensional space is disrupted: one part appears in front of the screen while the other part, which is occluded by the cinema's proscenium, is perceived to be located behind the screen plane. As a consequence, filmmakers have typically used a combination of conventional centre framing and positive-parallax to orient the object or character away from the edges of the frame and behind the screen plane to work around the issue of window violation. As well, there has also been significant innovation in regard to window violations, most notably Brian Gardner's 'dynamic floating window'.[32] For this, Gardner (2011) proposed masking the stereoscopic image with a malleable black frame. This enabled filmmakers to shift the screen's 'position, shape, and orientation' (p. 5) and avoid violations. So, for instance, instead of being positioned on the plane of the cinema wall, as in conventional cinema, the dynamic floating window could (subtly) move in or away from the cinema space. This means, window violations could be avoided by simply shifting the position of the screen to suit the composition of the image.[33]

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[32] Gardner's invention built upon earlier work by Richard and Nigel Spottiswoode in the 1950s, and Boston University's University Professors Program in the 1980s.

[33] The dynamic floating window therefore needs precise projection. A significant problem with dynamic floating window occurs when the image is over projected during exhibition. By projecting the image so that the edge of the image overlaps the proscenium, the false edge is rendered ineffective and the image violates the image once again.

In Gardner's (2011) paper on the subject, 'The Dynamic Floating Window – a new creative tool for 3D movies', two examples are used (see figure 2.13). The first (example "A"), shows a couch positioned on screen left and only partially seen. This appears to violate the screen window and distort spatial continuity: part of the couch is in front of the screen while another part is occluded by the proscenium and thereby perceived to be behind the screen. However, in another rendering of the image (example 'B'), this time using the dynamic floating window, the entire couch appears behind the screen. The screen has been pushed forward on the left-hand side in order to resolve its violation.
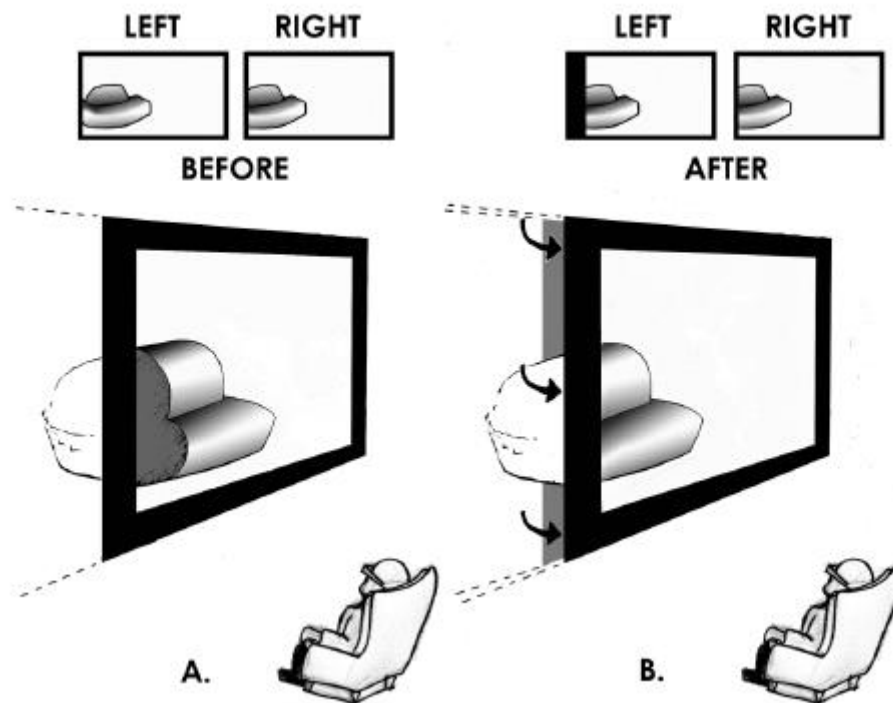
2.13: Brian Gardner's (2011) example of the Dynamic Floating Window from *The Dynamic Floating Window – a new creative tool for 3D movies* (p. 6).

This function alone is significant; it aids D3D's integration into conventional style by way of conventional framing techniques. But, as Gardner (2011) argues, the Dynamic Floating Window also has significant creative potential. That is:

> The stereo window has inherent visual meaning. By dynamically controlling the stereo window, we can manipulate the perception and emotional intensity of a story's moments – its story beats. To make a moment feel

"safer", we can position the dynamic floating window in front of the other elements. Alternatively, characters and objects on the audience's side of the stereo window can often have a stronger emotional impact on the audience. For example, you can increase the sense of impending danger in a scene by tilting the top of the dynamic floating window back, so as to place the threat into the audience's space and make it appear more looming (p. 10). [34]

The Dynamic Floating Window is also a creative tool that has the potential to extend or decrease the audience's space. In particular, it can be applied in terms of dramatic story beats: moments in drama which produce 'an irreversible change of awareness in one or more characters' (Rabiger & Hurbis-Cherrier, 2013, p. 41). Disney's *John Carter* is one of a number of D3D films that employs Gardner's invention for this purpose.[35] A notable instance occurs when the title character, John Carter, first arrives on Mars (which, in the film, is called, Barsoom). The scene shows Carter coming to terms with his new location and also his new jumping abilities. Each time he jumps, the filmmakers use the Floating Window to tilt the screen forward, essentially making Carter appear as if he is jumping into the theatre space before the camera catches up and positions him back on Mars. By emphasising the z-axis, the film simultaneously references an 'outie' stereoscopic aesthetic as well as it illustrates the character's growing awareness of his new location and his new abilities. In this respect, the Floating Window clarifies a dramatic story beat in a playful and interesting way.

D3D Cutting

The refining process is also present in the way D3D films are edited together, albeit in a much more obscure way than the Dynamic Floating Window. Here, the long-term trend in popular cinema toward a shorter shot length, which works to refresh the screen as well as notionally maintaining audience interest, building excitement and giving the film 'energy' (Bordwell, 2006, p. 123), is countered by the need for D3D filmmakers to give the audience enough time to

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[34] James Cameron and Vince Pace have spoken against using dynamic floating windows (Seymour, 2012). This position is despite the fact that Gardner's description of the DFW's creative potential would appear to complement *Avatar*'s 'sense of vertigo' (Cameron, 2010).

[35] Worldwide box-office: US$282,778,100. Released in Australia between 8/3/2012 and 1/4/2012 (24 days and five weekends) box-office totalled US$7,376,500 with a per screen average of US$7,189.

process extra depth information. In this context some intensified continuity devices are considered problematic in D3D production. They are understood to have the potential to confuse the audience and also cause strabismus (Robertson, 2009; Fox, 2010; Essman, 2010; Dams, 2010; Hemphill, 2010). In describing the notion of a 'turned down' style, for example, Cameron (in Cohen, 2008) refers to the conflict between conventional and stereoscopy by saying that '[i]t takes a few frames maybe the better part of a second, for the eye to properly assimilate the stereospace of a shot' (para. 26). [36] In short, the assumption is that filmmakers have naturally acted to limit the use of these devices and, in particular, not use as many cuts (and also to slow down camera movement).

However, this assumption is not entirely reflective of the situation. The fact that cutting rates offer a clear quantitative measurement means that the assumption can be tested. As noted in the literature review, Barry Salt's average shot length measurement (ASL) has become a basic reference for this type of test. Bordwell uses it to illustrate the faster cutting of intensified continuity:

> [Contemporary conventional] films are on average cut more rapidly than at any other time in U.S. studio filmmaking ... editors tend to cut at every line, sometimes in the middle of a line, and they insert more reaction shots than we would find in movies from classical studio years (2006, pp. 122 – 124). [37]
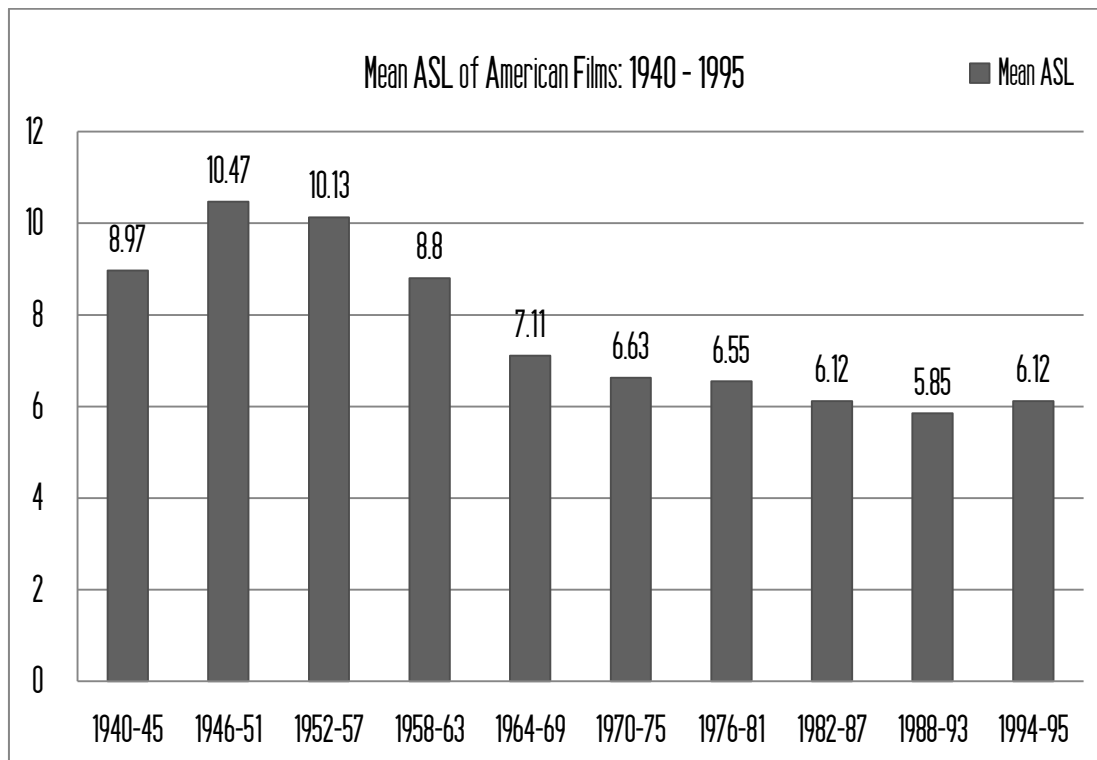
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[36] Others to make this point include Sky Sports executive producer, Martin Turner, who says that 'Viewers need more time to appreciate what they are seeing' (Dams, 2010, p. 45) and Sony Professional, Head of Sports Business, Mark Grinyer who argues that '... lots of fast cuts doesn't give you good 3D. If you're cutting really quickly, your brain needs a moment to see the image, to see what the depth is in the image' (Fox, 2010, p. 32).

[37] The trend is notionally true of Australian films as well. Using a larger sample period between 1990 and 1999 in order to analyse an appropriate number of films (sixty-two), Salt (2006) finds that the Australian films had a mean ASL of 6.5 seconds (p. 326). However, he points out that:

> When actually looked at, rather than just counted, the Australian films can be seen to be more distinctive for their content than their form. The only long-take movies in this Australian sample are due to Australia's original art movie director, Paul Cox, and his films continue to apply fairly ordinary scene dissection, though with the shots kept going longer than usual, to his characteristic very muted and recessive stories (p. 326).

Of the same period, Salt says that British films had a mean ASL of 7 seconds; Canadian films had a mean ASL of 7.1 seconds, and Indian films had a mean ASL of 6.7 seconds.

Instead of three or four reverse shots, we might get ten or twelve, with each line or facial reaction assigned a separate shot (2005, p. 26). [38]

Mean ASL of American Films: 1940 - 1995 ■ Mean ASL

1940-45	8.97
1946-51	10.47
1952-57	10.13
1958-63	8.8
1964-69	7.11
1970-75	6.63
1976-81	6.55
1982-87	6.12
1988-93	5.85
1994-95	6.12

2.14: The decreasing average shot length of American films (Salt, 2006, p. 333).

The overall trend has continued into the 2000s where 'a 6-to-7-second ASL … now looks sedate' (see figure 2.14; Bordwell, 2006, p. 123). Salt and Bordwell both explain that this decrease is a response to a range of factors, such as television, commercial and music video productions; multiple and lighter weight camera productions; and a trend toward the faster paced action genre (2006, pp. 121 – 124; Salt, 2006, p. 333). In general, the mean average shot length for contemporary films is understood by Bordwell (in Civjans & Tsivian,

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[38] Counter to Stork's (2012) notion of 'chaos cinema', Bordwell (2005) says that this does not necessarily break classical spatial continuity; rather it emphasises the spatial continuity. He argues that:

> The premises of spatial continuity still govern the way the scene is staged, shot, and edited. Indeed, the greater number of shots strengthens the reliance on classical continuity principles; because each shot is so brief, it needs to be more redundant in indicating who is where, who is speaking to whom, who has changed position, and so on (p. 26).

2013) to be approximately four-to-six seconds.[39] However, ASLs from this thesis suggest the cutting rates of Hollywood productions are even faster at around four seconds or less. Figure 2.15 provides the ASLs for 75 D3D films as evidence of this mean ASL.

Film	Year	ASL	Director
Spy Kids 3-D: Game Over	2004	4.84	Robert Rodriguez
Polar Express	2004	6.21	Robert Zemeckis
The Adventures of Sharkboy and Lavagirl	2005	4.36	Robert Rodriguez
Chicken Little	2006	3.09	Mark Dindal
Monster House	2006	4.25	Gil Kenan
The Ant Bully	2006	3.25	John Davis
Open Season	2006	3.67	Roger Allers, Jill Culton and Anthony Stacchi
Meet the Robinsons	2007	3.01	Stephen J. Anderson
Beowulf	2007	7.13	Robert Zemeckis
Journey to the Centre of the Earth	2008	2.39	Eric Brevig
Bolt	2009	4.2	Byron Howard and Chris Williams
Monsters vs Aliens	2009	4.01	Rob Letterman and Conrad Vernon
Ice Age: Dawn of the Dinosaurs	2009	3.64	Carlos Saldanha and Mike Thurmeier
Coraline	2009	3.83	Henry Selick
Up	2009	3.56	Pete Doctor and Bob Peterson
G-Force	2009	2.71	Hoyt Yeatman
A Christmas Carol	2009	8.9	Robert Zemeckis
Cloudy with a Chance of Meatballs	2009	3.62	Phil Lord and Chris Miller
Avatar	2009	3.71	James Cameron
Alice in Wonderland	2010	2.75	Tim Burton
Clash of the Titans	2010	2.76	Louis Leterrier
Shrek Forever After	2010	3.16	Mike Mitchell
Toy Story 3	2010	3.1	Lee Unkrich
Piranha 3D	2010	4.29	Alexandre Aja
The Last Airbender	2010	6.55	M. Night Shyamalan
Cats & Dogs: The Revenge of Kitty Galore	2010	3	Brad Peyton

[39] James Cutting, Daniel Levin, and Tim Smith (2012) have argued that, 'Given that films occupy our minds and drive attention, it seems fitting that the shot-duration patterns of popular film might increasingly be like those that our minds naturally generate' (p. 8).

Legends of the Guardians: The Owls of Ga'Hoole	2010	3.68	Zack Snyder
Resident Evil: Afterlife	2010	3.3	Paul W. S. Anderson
Jackass 3D	2010	7.75	Jeff Tremaine
The Chronicles of Narnia: The Voyage of the Dawn Treader	2010	3.06	Michael Apted
Megamind	2010	3.45	Tom McGrath
Tron: Legacy	2010	3.74	Joseph Kosinski
Tangled	2010	4.08	Nathan Greno and Byron Howard
Yogi Bear	2010	2.9	Eric Brevig
Gulliver's Travels	2010	2.98	Rob Letterman
Shark Night 3D	2011	3.8	David R. Ellis
The Green Hornet	2011	2.82	Michel Gondry
Sanctum	2011	3.97	Andrew Grierson
Gnomeo & Juliet	2011	2.62	Kelly Ashbury
Rio	2011	3.74	Carlos Saldanha
Mars Needs Moms	2011	4.19	Simon Wells
Thor	2011	3.05	Kenneth Branagh
Hoodwinked Too! Hood vs Evil	2011	3.43	Michael Disa
Pirates of the Caribbean - On Stranger Tides	2011	3.01	Rob Marshall
Cars 2	2011	3.09	John Lasseter and Brad Lewis
Transformers: Dark of the Moon	2011	3.21	Michael Bay
Harry Potter and the Deathly Hallows Pt.2	2011	4.2	David Yates
Captain America: The First Avenger	2011	2.82	Joe Johnston
Green Lantern	2011	2.86	Martin Campbell
Fright Night	2011	3.91	Craig Gillespie
Final Destination 5	2011	3.86	Steven Quale
The Smurfs	2011	3.46	Raja Gosnell
The Three Musketeers	2011	2.99	Paul W. S. Anderson
Arthur Christmas	2011	3.17	Sarah Smith and Barry Cook
Puss In Boots	2011	3.1	Chris Miller
The Adventures of Tintin : The Secret of the Unicorn	2011	4.6	Steven Spielberg
Happy Feet Two	2011	5.22	George Miller, Gary Eck and David Peers
Hugo	2011	3.76	Martin Scorsese
Journey 2: The Mysterious Island	2012	3.82	Brad Peyton
John Carter	2012	3.06	Andrew Stanton
Ghost Rider Spirit of Vengeance	2012	3.13	Mark Neveldine and Brian Taylor

The Avengers	2012	2.81	Joss Whedon
Men In Black 3	2012	3.06	Barry Sonnenfeld
Brave	2012	3.03	Mark Andrews, Brenda Chapman and Steve Purcell
Abraham Lincoln Vampire Hunter	2012	3.04	Timur Bekmambetov
Hotel Transylvania	2012	3.89	Genndy Tartakovsky
Bait	2012	2.87	Kimble Rendall
Frankenweenie	2012	3.03	Tim Burton
Dredd	2012	3.45	Pete Travis
The Hobbit: An Unexpected Journey	2012	3.41	Peter Jackson
Life of Pi	2013	7.11	Ang Lee
Oz the Great and Powerful	2013	3.93	Sam Raimi
Iron Man 3	2013	2.31	Shane Black
The Great Gatsby	2013	2.66	Baz Luhrmann
Frozen	2013	3.9	Chris Buck and Jennifer Lee

2.15. ASLs of 75 D3D films from the period 2004 to 2013.

Most of the films in figure 2.15 were released between 2009 and 2012, which reflects the fact that, while beginning around 2004, D3D took a number of years to fully form: 2009 has nine entries; 2010 has 16; 2011 has 23, and 2012 has 12. In terms of the mean ASL, the figure comes to 3.74 seconds/shot with a standard deviation of 1.22 seconds. *Iron Man 3*, directed by Shane Black, has the shortest ASL with 2.31 seconds, while *A Christmas Carol*, directed by Robert Zemeckis, has the longest with 8.6 seconds/shot.[40] Of the 75 films in table 2.15, there are 24 films that were produced in natural D3D (that is, shot with D3D cameras), 20 that were converted (converted into D3D during post-production), and 31 that were rendered (creating D3D via an animation rendering process). The results show that converted films have a lower mean ASL while rendered films have the greatest deviation (see figure 2.16). This appears to support the notion that D3D has an impact on the cutting rate, but only marginally, making it unlikely that an audience could perceive a distinct change between one film and another.

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[40] Robert Zemeckis's two films prior to *The Polar Express* (ASL: 6.21 seconds) and *A Christmas Carol* (ASL: 8.9 seconds) were *Cast Away* (2000; 9.5 seconds) and *What Lies Beneath* (2000; 7.1 seconds). Both of these films reflect Zemeckis's preference for longer takes.

Process	Number of Films	ASL	Standard Deviation
Natural	24	3.86	1.23
Converted	20	3.21	0.91
Rendered	31	3.98	1.31

2.16: A breakdown of D3D production types.

In general, the average shot lengths of these films follow the trend identified by Bordwell and Salt by decreasing over the sample period. That is, D3D films are shown to have lower ASLs over the period from 2004 to 2013 than preceding periods. This decrease occurs despite some notable longer shot length films, such as *The Polar Express* and *A Christmas Carol*, *The Last Airbender*, and *Life of Pi*. Figure 2.17 illustrates this decrease with a downward sloping trend line.
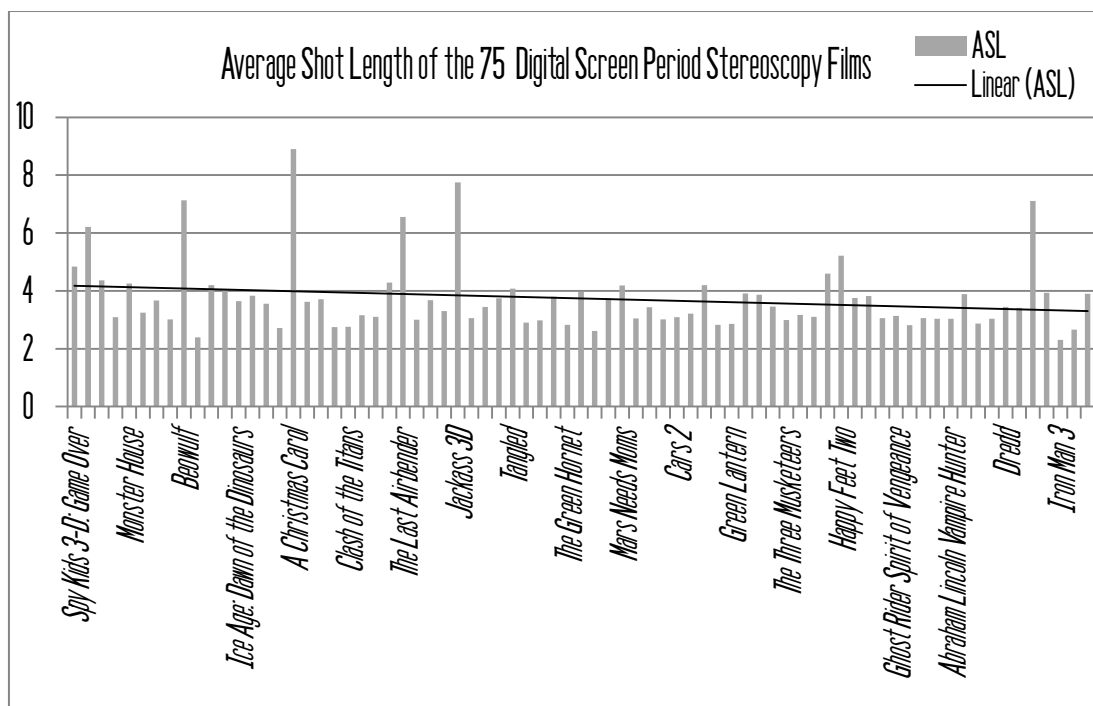
2.17: ASL of the 75 digital screen period stereoscopic films.

This would suggest that D3D has had little or no impact on the downward trend, despite the assumption that stereoscopy requires longer takes. D3D has not meant any significant disruption to cutting rates. In fact considering Bordwell's figures of between four and six seconds, the D3D films represent a further drop in cutting rates.

An analysis of digital screen blockbuster franchise production, which has shown significant D3D uptake, supports this view (see figure 2.18). This uptake corresponds with franchises becoming more dominant in mainstream production (Bordwell & Thompson, 2011, pp. 27 – 28). In relation to figure 2.18, the relative consistency of the story world over the course of the franchise offers a basis for comparison between conventional and D3D production, with the D3D films in the franchise presented in grey.[41]

Film	Year	ASL	Director
Shrek	2001	3.56	Andrew Adamson
Shrek 2	2004	3.66	Andrew Adamson, Kelly Asbury and Conrad Vernon
Shrek the Third	2007	3.58	Chris Miller and Raman Hui
Shrek Forever After	2010	3.16	Mike Mitchell
Toy Story	1995	2.82	John Lasseter
Toy Story 2	1999	3.27	John Lasseter
Toy Story 3	2010	3.1	Lee Unkrich
Happy Feet	2006	6.6	George Miller
Happy Feet Two	2011	5.22	George Miller, Gary Eck and David Peers
Pirates of the Caribbean - The Curse of the Black Pearl	2003	2.84	Gore Verbinski
Pirates of the Caribbean - Dead Man's Chest	2006	3.1	Gore Verbinski
Pirates of the Caribbean - At World's End	2007	3.11	Gore Verbinski
Pirates of the Caribbean - On Stranger Tides	2011	3.01	Rob Marshall
Resident Evil	2002	2.3	Paul W. S. Anderson
Resident Evil: Apocalypse	2004	1.56	Alexander Witt
Resident Evil: Extinction	2007	2.44	Russell Mulcahy
Resident Evil: Afterlife	2010	3.3	Paul W. S. Anderson
Tron	1982	3.93	Steven Lisberger

[41] It is worth noting that this type of analysis also illustrates differences between filmmaker styles within the context of a unified franchise story as well as between different eras of filmmaking.

Tron: Legacy	2010	3.74	Joseph Kosinski
Harry Potter and the Deathly Hallows Part I	2010	4.28	David Yates
Harry Potter and the Deathly Hallows Part II	2011	4.2	David Yates

2.18: ASLs of blockbuster franchises with D3D films.

In general, the D3D typically enters the franchise after a number of conventionally produced films have established the franchise. In the case of *Shrek*, *Pirates of the Caribbean* and *Resident Evil*, for instance, three conventional films preceded the inclusion of D3D. A number of the D3D films have a low or in some cases the lowest ASL in the franchise, a fact that supports the idea of D3D having little impact on the trend toward faster cutting rates.

However, it is noticeable that this trend is not replicated across all of the franchise productions. The *Resident Evil* franchise, for example, offers an interesting counter point to the low cutting rates of the others. The first three films of the *Resident Evil* franchise, namely *Resident Evil* (2002), *Resident Evil: Apocalypse* (2004) and *Resident Evil: Extinction* (2007), were produced using conventional methods of film production.[42] In contrast, the fourth film, *Resident Evil: Afterlife*, was produced in natural D3D: an example of 'turned down' and 'turned up' D3D.[43] Each of the films uses a concentrated form of intensified continuity – of strident stylisation – to illustrate the high-concept story based on a third-person shooter, action and horror, digital game (a medium that is typically limited in narrative complexity). The plot is advanced through the stylised and technologised action spectacle, a general idea (Neale & Smith, 1998, p. 13) that applies to the D3D example.

Across each of the four films the same generic narrative form is replicated with varying degrees of difference. Each film involves in some way the protagonist, Alice, the antagonist corporation, Umbrella Corporation, and a boss character – a representative of Umbrella Corp. – that Alice must defeat. In the

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[42] Combined total box-office: US$379. 5 million.

[43] Worldwide box-office: US$ 296,093,097. Released in Australia between 14/10/2010 and 14/11/2010 (31 days; five weekends) the film's box-office totalled US$4,440,687 with a per screen average of US$6,091.

first film, *Resident Evil*, for example, Alice and a small team, including CIA agent, Matt Addison, attempts to escape an Umbrella Corp. laboratory, called 'The Hive'. The lab, the audience is told, has been contaminated with the deadly, genetically-engineered T-virus, which is said to have the potential to enhance physical and mental performance. What becomes clear is that the T-virus has a dramatic side-effect: people and animals infected with the virus turn into the living dead (zombies). This information is preamble to the first film's climactic fight between an infected, genetically engineered, 'super zombie', and Alice. *Apocalypse*, the next film in the franchise, replicates much of the structure of *Resident Evil*; however, instead of an underground laboratory, Alice must escape the prefecture of Raccoon City. This she does but not before needing to fight another genetically engineered 'super zombie'. *Apocalypse* ends with Alice's escape into the third film of the franchise, *Extinction*. In this film the virus has spread beyond 'The Hive' and Raccoon City and has infected people around the globe. A small group of survivors, aided by Alice, search for a zombie-free utopia, called Arcadia. The survivors do not know that Umbrella Corp. is at the same time attempting to hunt down Alice. When the corporation locates Alice (and the survivors) they unleash a horde of mutant zombies which leads to a large scale fight. *Afterlife* is initially set in Japan, specifically in another underground facility which hosts another action sequence and another victory for Alice. The climax includes another fight with a 'super mutant' on a cargo ship called, Arcadia (a figurative paradise).

The repetition of narrative form is a basic component of a comparison and contrast analysis. It means, for instance, that each film's stylistic treatment represents filmmakers' tastes and technological effect. In this context, the conventional films in the franchise have noticeably shorter ASL figures. In the case of *Apocalypse* – the second film in the franchise – the ASL is less than half that of the D3D film, *Afterlife*, which, rather than reiterate the downward trend, shows that D3D has increased cutting rates. This increase corresponds with the anecdotal evidence of *Afterlife* editor, Nivon Howie, and cinematographer, Glen MacPherson.

Howie (in Essman, 2010):

> I cut a little bit slower than I would have if it was 2-D even though there's some pretty fast action in there. In *Death Race* (2008), we broke the record of number of edits at the lab [at three thousand]. The average edit length was a second and two frames, and the drama sequences were actually quite slow. In this one [*Afterlife*], I had just over half that number (p. 55).

MacPherson (in Hemphill, 2010):

> Very fast cutting can be annoying unless you reduce your I/O [interaxial distance] to almost zero, close to 2-D. Our approach to the action sequences was to slow down the editing pace and play a lot of it in slow motion so your eye has a chance to scan the frame and take in the huge sets, falling slo-mo rain and the character doing a back flip in 3-D (para. 22).

In other words, the filmmakers accepted the limitations of D3D and altered their editing style accordingly.

Further evidence of this change is highlighted in an analysis of the franchise's ubiquitous 'boss' fight sequences. These are action set-pieces that are used to denote dramatic story beats. In *Resident Evil*, for example, the fight sequence is used to illustrate a final barrier the protagonist, Alice, must prevail over before succeeding in her primary goal, that is, to escape the Umbrella Corporation laboratory. In *Afterlife*, the fight scene marks a transition from the prison setting to the narrative's resolution on board the cargo ship, Arcadia. As one might expect, each fight sequence employs shorter shot lengths than that of the various other, less kinetic, action scenes in each film. Figure 2.19 includes measurements of each film's fight sequence's ASL in contrast to each film's total ASL.

Film	Year	ASL	Fight Seq. ASL	Director
Resident Evil	2002	2.3	1.08	Paul W. S. Anderson
Resident Evil: Apocalypse	2004	1.56	0.7	Alexander Witt
Resident Evil: Extinction	2007	2.44	1.31	Russell Mulcahy
Resident Evil: Afterlife	2010	3.3	2	Paul W. S. Anderson

2.19: *Resident Evil* franchise. Total ASL and fight sequence ASL.

Once more, this shows *Afterlife* uses a significantly greater average shot length than the other films; in fact, the standard deviation of *Afterlife*'s fight scene is 1.7 seconds whereas *Resident Evil* and *Extinction* have standard deviations of 0.88 and 1.5 seconds, respectively. Figures 2.20, 2.21 and 2.22 provide a visual representation of shot length variation in *Resident Evil*, *Extinction* and *Afterlife*.
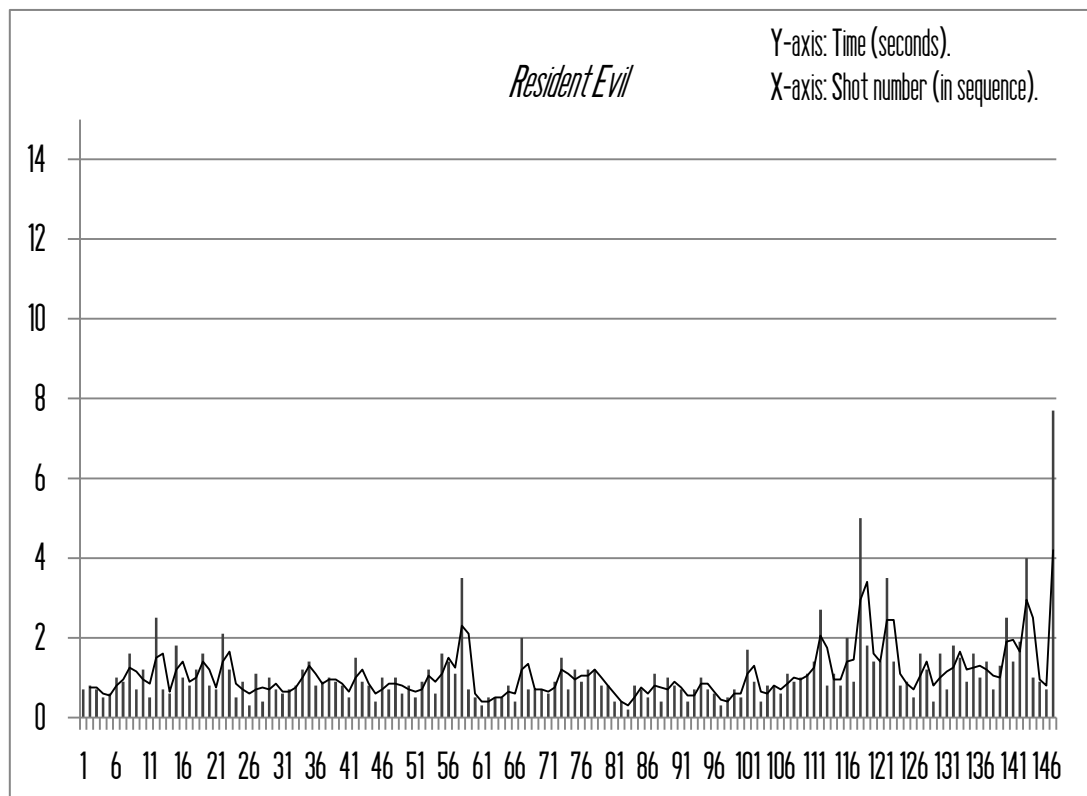
2.20. *Resident Evil*. Fight sequence shot length variation.
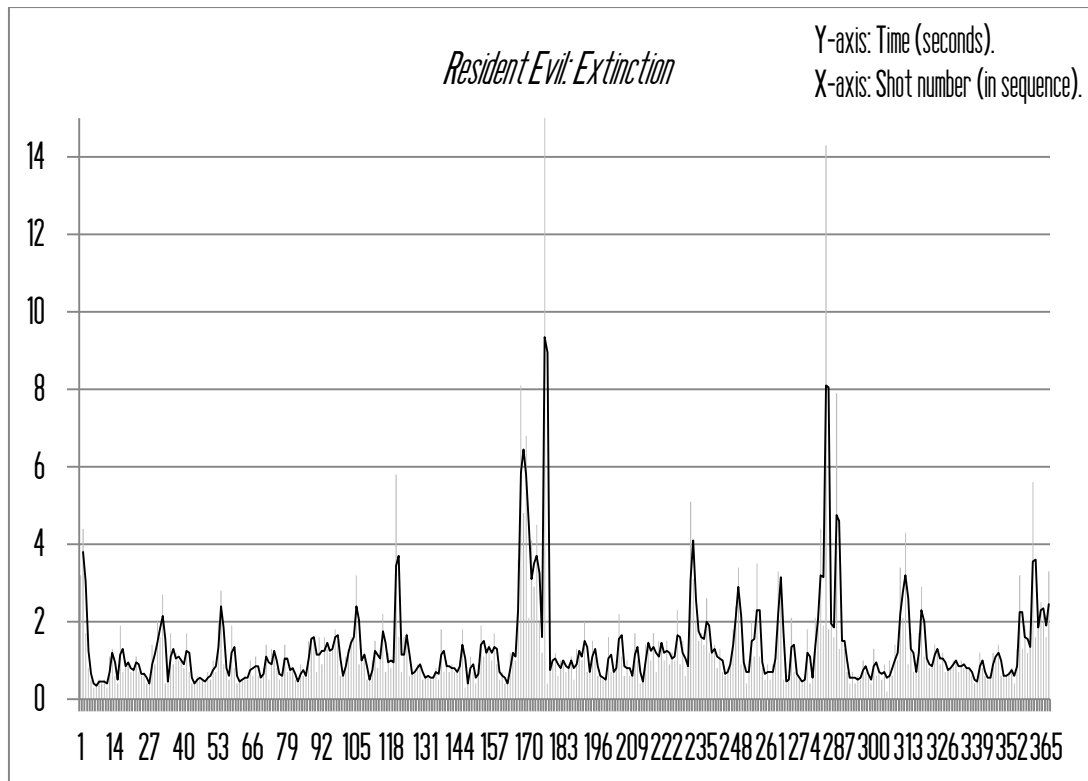
2.21. *Resident Evil: Extinction*. Fight sequence shot length variation.
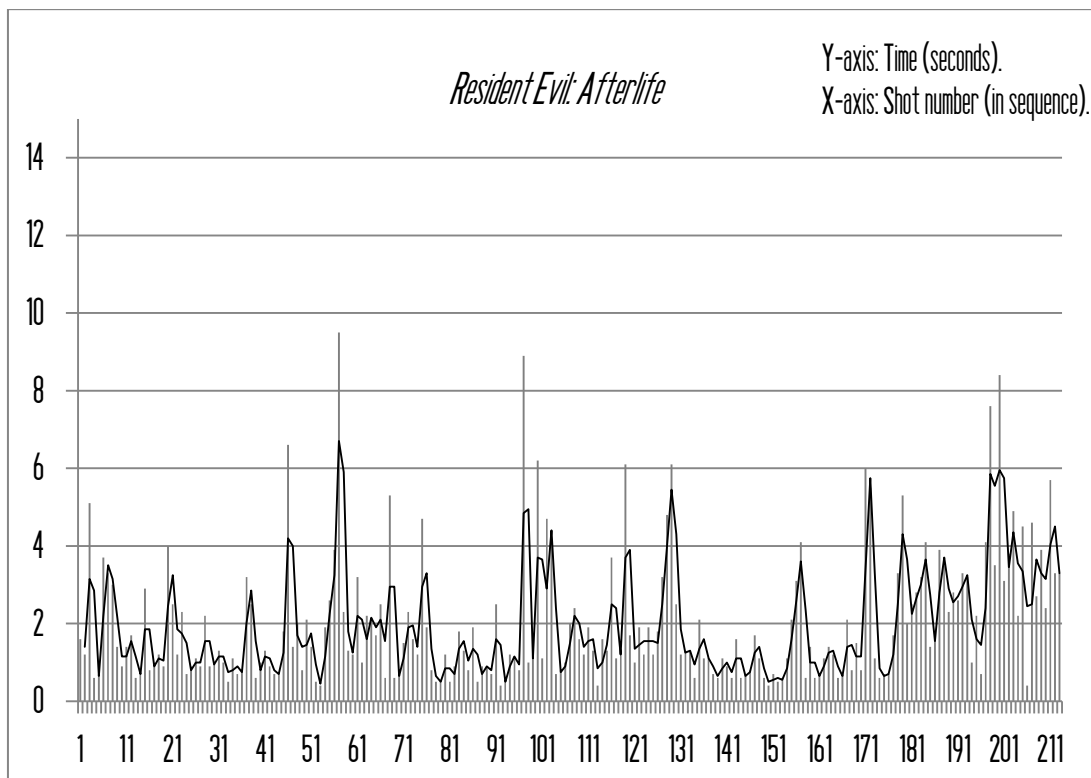
2.22. *Resident Evil: Afterlife*. Fight sequence shot length variation.

In terms of *Resident Evil: Afterlife*, rather than 'turn down' the D3D and utilise intensified continuity devices, such as hyperactive camera movement and

high cutting rates, as per the other films in the franchise, the filmmakers used devices, such as slow-motion photography and greater shot length variability, to illustrate the action. The variation in shot length in figure 2.22 is particularly clear when compared to 2.20, while 2.21 shows evidence of virtuoso shots that break the fast sequences. Here the minutiae of *Afterlife*'s scene, such as a swinging axe or a connecting blow, are highlighted and intensified via other visual devices, in particular slow-motion photography. As noted by MacPherson (in Hemphill, 2010), these images are slowed down and lengthened for greater visual effect (the standard deviation for *Afterlife*'s fight scene is 1.7 seconds, while for *Resident Evil*'s fight scene the figure is only 0.88 seconds). During these sequences, filmmakers have opportunities to include negative-parallax images, such as an axe moving into the audience's space, which work as a stereoscopic in-joke and a moment that illustrates the director's virtuosity. In short, the evidence suggests that the *Afterlife* filmmakers changed their visual style from their previous film, *Resident Evil*, as well as the franchise's overall visual style, such as shot length variation, in order to accommodate D3D devices, including device limitations.

In all, what the analysis of D3D films shows, when situated against Bordwell's and Salt's analysis of contemporary Hollywood style, is that D3D does have an impact on shot length.[44] When an individual film's ASL is positioned within the three-to-four second ASL range, or longer, the broad effect that D3D has on cutting is less noticeable. Its cutting rates correspond to conventional film cutting rates. However, when an individual film's ASL is lower than this range, as with the first three *Resident Evil* films, the effect becomes increasingly clear: conventional filmmakers have confidence in using extremely short shot lengths, but D3D filmmakers appear to reach a point when they decide that the benefits of taking up the screen technology in relation to fast cutting action sequences is less significant (at around two seconds per shot). Consequently, D3D's impact on cutting rates is limited to those filmmakers working within the lower range, although it is conceivable that other filmmakers are impacted on in

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[44] A range of factors motivate shot lengths. Analysis of the *Resident Evil* franchise provides a base that illustrates a general point regarding the relationship between cutting and creative approaches to D3D filmmaking.

constructing scenes of intense action in otherwise slower cut films. This result suggests that the uptake of D3D in action films is managed by what Cameron referred to as turned-down stereoscopy, which renders sequences in a more conventional, intensified continuity, visual style. It also suggests that turned up D3D, when three-dimensional spatial characteristics are more pronounced, is more suitable for more dramatic films, or dramatic sequences in fast cut films. As one might expect, this has precipitated some adjustment to visual style, as in the adoption of greater shot length variation and slow motion photography (with an emphasis on moving particles).

3). D3D NARRATIVE FORM

Certain productions illustrate the D3D style more than others, and many of these use a particular narrative form. As in Paul's identification of horror and sex in relation to the 1950s boom, where the two key forms followed a trend toward negative-parallax novelty, D3D typically relates to a transition within a film's diegesis between an actual and alternate reality. This transition occurs in a variety of ways and in a variety of genres, such as fantasy, comedy, science-fiction, and action. In D3D, filmmakers show a protagonist's immersion into an alternate reality and attempt to achieve an analogous immersive and inhabiting experience for the audience. The intention of these films is to motivate the audience to follow John Carter as he becomes Dotar Sojat on Barsoom (*John Carter*); Alice as she follows the white rabbit down the rabbit hole (*Alice in Wonderland*); Coraline Jones as she is tempted by the 'Other world' and the 'Other' parents (*Coraline*); and Shrek as he signs the contract with Rumpelstiltskin to live a different life (*Shrek Forever After*); and so on.

Scholar James Walters (2008), though not concerned with D3D, separates the depiction of alternate worlds in Hollywood films into three major categories. The categories are:

> (i) Imagined Worlds, where a character dreams or hallucinates a world away from the world they inhabit, (ii) Potential Worlds, where a character visits an alternative version – or alternative versions – of the world they inhabit, and (iii) Other Worlds, where a character travels

to a different world entirely from the world they inhabit
(pp. 10 – 11).

They each depict a slightly different version of an alternative world. Importantly, each category is used in relation to D3D film: *Shrek Forever After*, for example, relates to the first, while *Coraline* relates to the second and *Carter* closely relates to the third category. The pervasiveness of each category in D3D film highlights the implication that the form has followed the function of D3D style in developing deeper audience experiences.

There are other contributing factors that explain why the form has been adopted. Daniel Mendelsohn (2010), in a review of *Avatar* for *The New York Review of Books* alludes to the form when discussing *Avatar*'s connection to *The Wizard of Oz* and Dorothy's journey, whereby each transition into and out of Pandora/Oz is complemented by technological and stylistic devices. Mendelsohn's comparison between the two films, however, takes him to a broader cultural conclusion about digital technology, including D3D, and online media. The crux of his conclusion is that *Avatar* does not completely adhere to the narrative form. Jake Sully does not re-emerge from the alternate reality like Dorothy and like characters in other D3D films; instead he chooses to stay in the alternate existence. This, Mendelsohn argues, is because of the lure of the alternate. Enabled by 'link bed' technology, Sully takes the form of a Na'vi warrior and learns the Na'vi culture. As the action develops, Sully's identity becomes increasingly linked to this alternate reality, which he later takes as his true self, refusing to return to his more mundane human existence. For Mendelsohn, this action is the key message of the film:

"reality" is dispensable altogether; or, at the very least, whatever you care to make of it, provided you have the right gadgets. In this fantasy of a lusciously colourful trip over the rainbow, you don't have to wake up. There's no need for home' (para, 31).

His point is that the use of alternative realities in *Avatar* relates to the various anxieties about digital media. It draws upon the broad fear about online identity, about people blurring their actual and alternate identities together, and about the loss of notions of humanness. Then again, Sully's refusal to return to

his actual reality also aligns with Cameron's desire to see an ongoing engagement with stereoscopic alternate realities. The narrative then plays as metaphor for stereoscopy's longevity to do with industry uptake and audience engagement.

In this context, the narrative form also notably correlates with the diversification of popular entertainment conglomerates and their production of franchises. It synchronises (and synergises) with industrial movements that see conglomerates attempting to maximise intellectual property value across their respective (tight) diversified media holdings.[45] It enables conglomerates to maximise their holdings, and, as Elsaesser (2013) says in regard to the digital screen period, to combat the threat of the web's business model with franchise production, merchandising and themed entertainment (p. 221). The Walt Disney Company's *Tron* franchise represents a complex example of conglomerate synergy. Its cross-platform franchise strategy corresponds to what Henry Jenkins calls transmedia storytelling: 'a process where integral elements of a fiction get dispersed systematically across multiple delivery channels for the purpose of creating a unified and coordinated entertainment experience' (Balio, 2013, p. 47; Jenkins, 2007).[46]

Unlike *Avatar*, where the interest is in dispensing with the actual reality, *Tron* actively blurs its actual reality with the alternate. The characters do not need to choose one reality over the other, but inhabit a fictional world where they are shown to cross between each reality as the story progresses. In terms of the franchise, this means *Tron* has the potential to sustain an audience for longer periods across each of its sites of production and each of its realities. The franchise story is told over two feature films (*Tron* [1982] and *Tron: Legacy*), an alternate reality game (ARG. *Flynn Lives*), a two-part graphic novel (*Tron:*

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[45] Tight diversification is defined by Neale and Smith (1998), with reference to Tino Balio, as 'the concentration of a conglomerate's assets and activities around closely related commodities, rather than a "loose" diversity of interests characteristic of earlier conglomerates formed in the 1960s, like Gulf + Western' (p. xvii).

[46] Transmedia storytelling is also referred to as transmedia authorship, cross-media entertainment, cross-sited narratives, media mix, transfiction, multiplatform storytelling, deep media, screen bleed and a fractal deployment of intellectual property (Long, 2007; Hanson, 2003, pp. 46 – 47; Bordwell, 2009; Rose, 2011).

Betrayal), two digital games (*Tron: Evolution – Battle Grids* and *Tron: Evolution*) and a short film (*Tron: The Next Day [Flynn Lives Revealed]*). Each of these productions contributes in expanding the parameters of the intellectual property at the same time as they help to construct a causal (synergised) bridge to the other productions (see figure 2.23). Significantly, this structure funnels the audiences toward the key D3D production, *Tron: Legacy* (Jenkins, 2006).
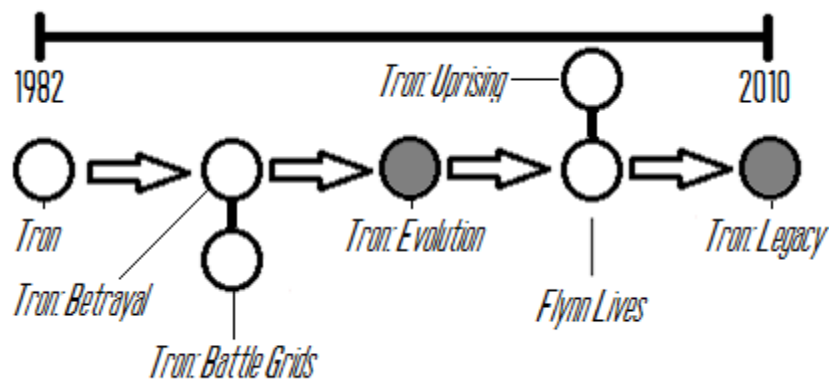
2.23: *Tron* franchise. Linear depiction of the narrative thread. The grey circles denote the use of stereoscopy.

The benefits of this type of franchise structure have been debated by both Bordwell and Jenkins. Bordwell (2009) has argued that:

> The "immersive" ancillaries [as in *Betrayal*, *Battle Grids*, *Evolution* and *Flynn Lives*] seem on the whole designed less to complete or complicate the film than to cement loyalty to the property, and even recruit fans to participate in marketing. It's enhanced synergy, upgraded brand loyalty (para. 27).

The commercial aspects of the franchise production outweigh any narrative benefit; a position that reflects the notion that 'the theatrical release of a film is the marquee and billboard that allows a movie property to accrue cultural capital and enter all the subsidiary markets' (Elsaesser, 2013, p. 223). Henry Jenkins (2009) has pointed out that 'one man's promotion is another man's exposition', and:

> Increasingly, transmedia extensions are released in advance of the launch of major franchises and do some basic work orientating us to the characters, their world,

and their goals, allowing the film or television series to
plunge quickly into the core action (para. 15).

In other words, the ancillaries work to ease the audience into the franchise by acquainting them with the main characters and themes of the film, deepening their insights into the story world as well as expanding the scope of world itself. As a result, the film and its narrative form are placed at the centre of the franchise. It is the creative impetus without which each production would not cohesively exist in relation to each other.[47] This positioning means that the use of D3D in the feature film has a significant impact on the way ancillary products are created and designed to relate to the other products in the franchise. The screen technology is similarly integrated into ancillary franchise productions that contribute to expanding the film's narrative. Ancillary productions also show corresponding characteristics of production design and spatial fidelity, which complements the D3D feature. The *Tron* franchise includes each of these aspects; in particular it illustrates Bordwell's and Jenkins's main arguments about franchise including point of difference via fan ownership ('an upgraded brand loyalty');narrative form via transmedia storytelling; and uptake of design characteristics that are intended to bring the fan's and protagonist's realities together.

Fans » Participants: Actual and Alternate

The lead up to the release of *Legacy*, which focused on *Evolution* and *Flynn Lives* productions, is a case in point. This period saw the narrative and the franchise's attempts to engage the audience intensify. Dangling clauses, that is, 'information or action which leads to no effect or resolution until later' (Thompson, 1999, p. 12), for actual and alternate realities were constructed; new and important characters were illustrated more thoroughly, such as back stories for Kevin Flynn's son, Sam Flynn; and *Legacy*'s visual design was foreshadowed and exhibited. In terms of franchise structure, *Lives*, a complex ARG, and *Evolution* play important roles in connecting the franchise's range of products, its settings, and its diverse aesthetic characteristics to the franchise's

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[47] This is a reference to Kristin Thompson's (2007) point in *The Frodo Franchise* that, 'The film is the centre of the franchise, the product without which the others could not exist' (p. 331).

main production, the D3D film, with particular regard to narrative consistency and visual style. The period leading up to the release of *Legacy* was designed to create awareness of the franchise narrative as well as to define the narrative logic that introduces and legitimises the use of D3D in *Legacy*: to build a causal bridge that funnels an audience to the feature film and contextualises visual depth with the franchise's narrative complexity.

The goal of most ARGs is to solve a central mystery. In *Flynn Lives*, the mystery 'Where is Kevin Flynn?' acts as a form of McGuffin plot device. It has little bearing on the results of the game but helps the game to illustrate and merge narrative and visual style elements of other productions, notably *Betrayal* and *Evolution*. In order to achieve these goals, *Lives* focuses on Flynn's company, ENCOM; his son, Sam Flynn; and a small movement made up of avid Flynn supporters, collectively known as Flynn Lives. It does so with significant complexity and detail, which asks fans to become participants in the franchise's story world.

Lives began during July 2009. The first phase saw a number of packages sent to movie websites containing Flynn's Arcade tokens (a reference to arcade in the 1982 *Tron* film) and a USB memory stick holding a GIF with CSS code lines. After a short period of time, during which the movie websites discussed the package and the meaning of the code lines, a URL for *Flynnlives.com* was discovered.

The URL began the second and broader phase of the ARG. On the website participants found more clues. In the Terms of Use section, for instance, the address 611 k street b, San Diego, was found. This find began a series of information hunts which saw fans make the transition to become participants in the evolving *Legacy* story. At the same time as the San Diego find, various links to other websites suggested that new information regarding the franchise would be released at 9:30pm, Thursday 23rd July. Knowledgeable gamers found that the date coincided with the first day of the San Diego Comic Con International event which was to be held short distance from 611 k street b. The event was scheduled to feature a preview of the *Tron: Legacy* designs and trailer film.

Upon entering the *Tron* preview, fans were handed the same arcade tokens as the movie websites were during the first phase of the ARG. These fans – now willing participants – were asked to go to J Street and 1st Avenue at 9:30pm later in the day. Once there, participants were invited to play a scavenger hunt. They were given a black light and a map of the area and told to search for special *Flynn Lives* posters. The posters showed coordinate information when lit by the black light. This information led the participants to the next destination, 335 6th Street (approximately thirty metres from the address 611 k street b). Here, a working replica of Flynn's Arcade was revealed featuring iconic *Tron* games, such as *Space Paranoids*. During the night the back wall of the venue opened to reveal a passageway leading participants to a new room featuring a life-sized *Tron* 'Light Cycle' and free *Tron* T-shirts (printed onto the shirts were the logos for 'Flynn Lives' and 'Flynn's Arcade'). Later in this phase, a similar scavenger hunt involving twenty five cities around the world took place which ultimately funnelled participants back to the ARG website. In short, at each point of the ARG fans were provided with equal amounts of game and story information, as well as marketing information, the two blurring into one.

In the wake of both scavenger hunts a series of quizzes were released online. Each time a participant completed a quiz they received a *Tron* badge as a reward. When the badge's QR code was scanned participants were directed to the internal ENCOM International website, the setting for the events of the 1982 *Tron* film. Participants could login to an email account enabling them to source company information. Eventually, a press release appeared online outlining an upcoming ENCOM press conference, featuring Allen Bradley – a character from the 1982 film. Scheduled for 8pm, April 2, 2010 at Justin Herman Plaza in San Francisco (coinciding with WonderCon, another fan convention, held between 2nd and 4th of April, 2010), *Flynnlives.com* began motivating participants to crash the event. They were to meet near the Plaza at the Hyatt Regency at 6:30pm and wear their 'Flynn Lives' T-shirt before joining the ENCOM crowd and rushing the stage in support of Kevin Flynn. At the same time, Sam Flynn, Kevin's son, was attempting to crash the press conference, but rather than crash the event by ground, Sam used an ENCOM helicopter to skydive down to the event. This new role was intended by the ARG producers to heighten the sense

of narrative ownership among fans. So, in addition to owning a t-shirt or poster, fans essentially became participants in the story.

The final phase of the ARG pivoted its story into the *Legacy* story. It motivated participants to attempt to contact Kevin Flynn. Since the ARG began, participants regularly received encoded messages from an anonymous source. In one of the final posts to *Flynnlives.com* it is suspected that Kevin Flynn is behind the messages. The aim, then, was to 'isolate the source signals' (*Flynnlives.com*, 2010) and attempt to send a message back to him. Eventually, a message was sent which appeared to have been received, but who received the message was only revealed when participants attended screenings of *Tron: Legacy*.

Overall, the ARG worked to blend characteristics of the fictional world with the participants of the actual world. It developed the character, Sam Flynn, and made him an action figure, and it also provided the dangling clause concerning the fate of Kevin Flynn, which heightened the anticipation of the D3D film. In general, *Flynn Lives* provided the context and motivation for the events depicted in *Legacy*. Its success was enticing the audience to participate. To quote *Flynn Lives* producer and CEO and President of 42 Entertainment, Susan Bonds (in Rose, 2011):

> What we were able to do, which, I think, is a great example of how you can create a themed experience but have it intersect our lives so you can pop in and out of it, was to create an alternate reality game where we gave a central role to the players to uncover and collaboratively piece together a big part of the story.

That is, the success of the ARG was in making the fictional narrative slowly become reality; fans become participants, or owners of the story; and marketing information blur and build with story information.

At the same time, just as the ARG explored the actual world's connection to the alternate, the digital video game, *Evolution*, a third-person action and adventure game released on 25 November 2010 (three weeks before *Legacy* was

released), explores the alternate world's connection to the actual. The game marked the franchise's final opportunity to illustrate the alternate reality of the Grid: the machinery-heavy and angular cityscape environment, and the simple black, grey, neon-orange and -teal colour palette.[48] This, for the most part, is limited to zero- or positive-parallax D3D; that is, it attempted to invite the audience into the alternate reality. It also entices the potential cinema audience with a series of dangling clauses that similarly heighten the sense of anticipation regarding the D3D film. For instance, by the end of *Evolution* the fate of the Grid and its inhabitants (programs) is unclear. CLU (Codified Likeness Utility), a program that was created by Kevin Flynn to act as a digital proxy, has rebelled, taken power and 'derezzed' imperfect digital cultures, called the ISOs; while Kevin Flynn has escaped into exile, seen for the last time saving a program named Quorra. It provides detail about the events of the ARG but not comprehensively, that is, back stories and characterisations are detailed but narrative closure is avoided in order to lead the gamer to the film.

The final phases of the ARG and the digital game leave questions unanswered. *Tron: Legacy*'s prologue attempts to pull each of the narrative threads from the ARG and the digital video game together and begin to answer these questions. As such, the prologue combines the actual reality (as depicted in *Flynn Lives*) with the alternate reality setting (*Evolution*). In this context, the prologue also briefly defines the D3D narrative form. For example, it begins with a predominantly black screen as it follows a single neon line moving along a gridded canvas. Shortly after, a familiar voice, Kevin Flynn's, describes a place called the Grid, the virtual space depicted in the original 1982 *Tron* film. He calls it 'a digital frontier', and as he does so more lines enter the screen moving in three-dimensional space: some lines move upwards, some down, some going right, some left, others move in towards the audience or out away from the audience along the z-axis. After a brief moment the lines begin to take the shape of a city. They make an outline of office towers, roads, intersections and sidewalks. The image tracks along these outlines until they are recast and

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[48] Henry Jenkins (2006): 'In the era of digital effects and high-resolution game graphics, the game world can now look almost exactly like the film world [or the television world] – because they reuse many of the same digital assets' (p. 106).

subsequently filled-in with the familiar look of concrete and asphalt paving: the neon outline has given way to an actual city. This transition means there are now painted lines on the road, cars moving to-and-fro, and there are lights in the office towers. The *Tron* logo appears and the scene's soundtrack peaks in a chorus of computerised synthesizer and earthly orchestral strings. In other words, in this short space of time the film has alternated between the narrative form's two realities. At this point, a young boy's voice asks about the Grid:

> YOUNG BOY: 'You got in?'
> KEVIN FLYNN: 'That's right, man. I got in'.

Notionally, the audience is supposed to 'get in' too, but not before the narrative motivates the immersive and inhabiting transition.
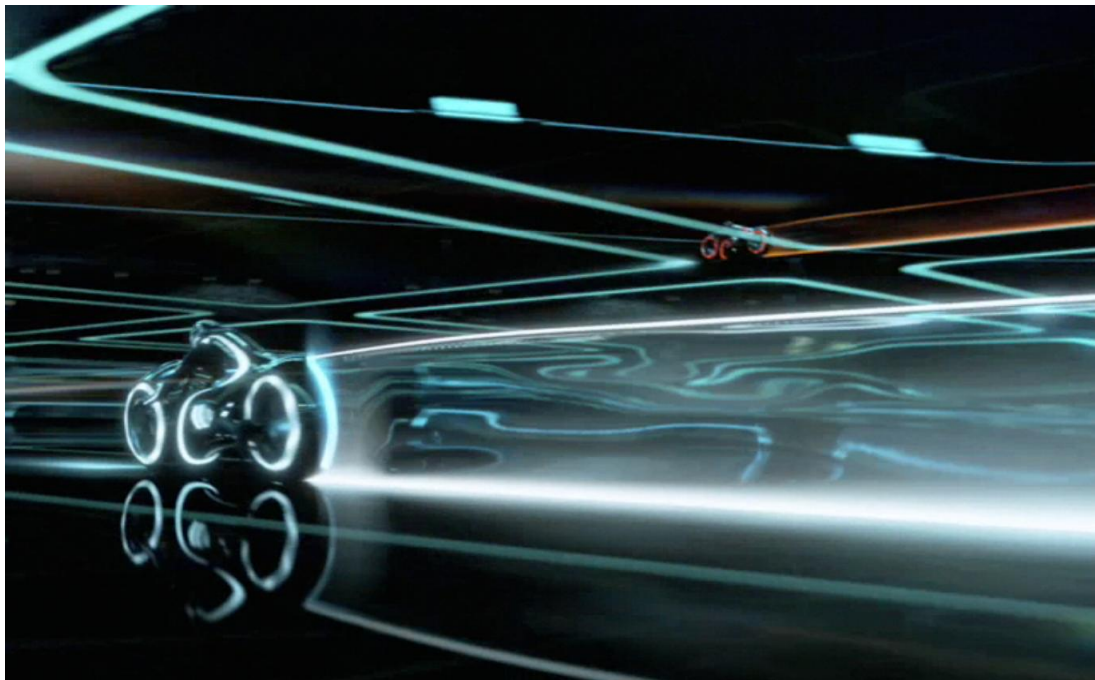
Tron: Legacy

The film begins conventionally by illustrating depth via monocular depth cues with very little D3D. It is only when Sam Flynn looks for his father and inadvertently triggers a laser that digitises and sends him into the Grid that D3D begins to be used. In general, this use makes the alternate reality visually distinct from the actual reality (and vice-versa) within the film's diegesis. Instead of a film like *The Wizard of Oz*, where a similar transition is punctuated with a progression from black and white to Technicolor, the Grid is illustrated with D3D depth and techniques (see figures 2.24, 2.25 and 2.26). Its depiction fluctuates between CinemaScope 2.35:1 and IMAX 1.78:1;[49] it uses holographic images and moving particles to suggest a viscous space; and is shaped by a subtle use of Gardner's floating window.

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[49] A 1.78:1 aspect ratio is used six times during the course of the entire film. The first and most notable instance takes place when Sam Flynn enters the Grid.

2.24: *Tron: Legacy*. A contestant is "derezzed" during a Disc Battle, sending his cells flying, most moving along the image's z-axis.

2.25: *Tron: Legacy*. The layered holographic Light Cycle coliseum provides a layered setting for linear compositions and monocular depth cues, such as relative size, occlusion, light and shading.
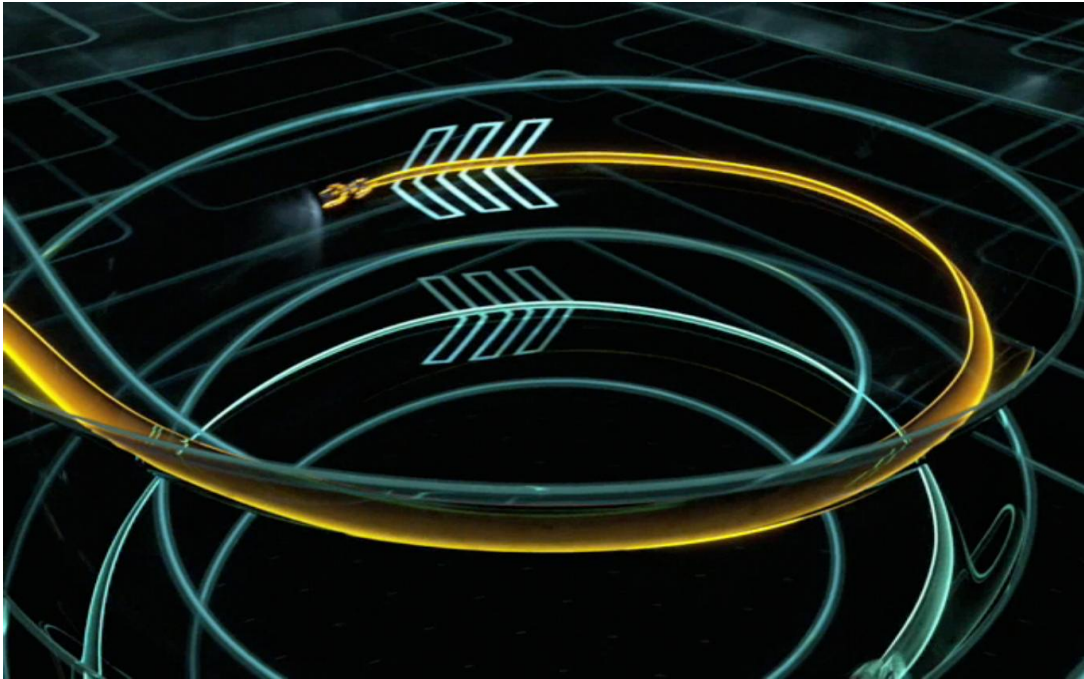
2.26: *Tron: Legacy*. Light Cycles (and their holographic light ribbon) illustrating depth.

Although the transition from conventional to D3D highlights *Legacy*'s use of the screen technology – a key point of difference for the film's producers – visual depth is employed conservatively throughout the film (Prince, 2012, p. 210). This characteristic makes *Legacy* emblematic of D3D's stylistic transition into the classical Hollywood system so that D3D and monoscopic devices coexist, and are subordinate to the narrative system. In the context of the *Tron* franchise, this transition is writ-large with the combination of ARG and digital game aesthetic within the feature film, a synthesis of actual reality blurring into an alternative reality.

Moreover, *Legacy* illustrates the significance and complexity of digital screen marketing. The ARG, in particular, combines franchise marketing and story world expansion together in relation to D3D's dominant narrative form. This combination includes fan loyalty for the feature film as well as a depiction of the actual reality setting that begins *Legacy*. It also plays an important role in distinguishing the immersive progression into the alternative reality, signposting Sam Flynn's (and by proxy, the audience's) immersion in the Grid. *Evolution* offers a similar combination of playable content and marketing information. In addition to the construction of a narrative bridge, the ARG and the digital game attempted to convert fans into participants or owners of the franchise story.

These features illustrate the significance of the feature film, with each ancillary playing a role in driving box-office sales. In this context, the use of D3D essentially reiterates a point of difference within the franchise, differentiating the feature.

Despite the application of the narrative form and its potential to evolve via a transmedia franchise structure, *Legacy*, and by extension the *Tron* franchise, was deemed unsuccessful. *Film Comment*'s 'Grosses Gloss' writer, Donald Wilson (2011), called it one of Disney's 'high-profile tankers' alongside *Prince of Persia* (2010) and *The Sorcerer's Apprentice* (2010)' (p. 52). The film's worldwide box-office was US$400,062,763 on an estimated production budget of US$170 million. In Australia, the film was released over a 52 day period that included eight weekends and the summer school holidays (between 16/12/2010 and 6/2/2011). It achieved a box-office of US$14,505,106 with a solid per screen average of US$10,914. This performance did not require a write-off, as Disney would need to do following *Mars Needs Moms* and *John Carter*, but it was certainly not successful enough to warrant immediate expenditure on other *Tron* franchise productions.[50] Nevertheless, Walt Disney Picture's sister company, Disney Television Animation, did produce an animated series, called *Tron: Uprising*, which continued to expand the narrative. There was a total of 19 episodes produced.

Tron: Legacy's application of the D3D form is an example of an attempt by the filmmakers to move away from historical modes of D3D production. The film, as well as others, counters the claim that D3D is merely a novelty 'illusion thinner than the air through which it moves' (Paul, 1993, p. 345). *Legacy* presents a potential case to see D3D as having achieved a more sustained use in popular film, one where particular visual characteristics of the screen technology correspond to popular narrative forms. So, unlike other production periods, in the digital screen period, stereoscopy is a filmmaking option that has the potential to create particular aesthetic experiences that may or may not correspond to multiple platform franchise production.

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[50] According to Balio (2013), Disney needed to write off nearly all of its US$175 million investment in *Mars*, while it was forced to take a write-down of approximately US$200 million for *Carter* (p. 49).

CHAPTER CONCLUSION

It is understandable that filmmakers have actively moved away from a novelty aesthetic, particularly since it has been so thoroughly identified as contributing to stereoscopy's demise during its history of use in the film industry. The resulting aesthetic is an amalgam of D3D, classical and contemporary cinema style and form, which orients the image within popular cinema's normative structure. In this context, rather than competing with classical film style, D3D extends this style, whereby novelty's obtrusive point of difference is avoided and exchanged in most cases for an attempt to visually and psychologically submerge the audience in correlation to the protagonist's journey. Film devices, such as floating particles, floating windows and frame masks, have been developed to place an emphasis on the theatre's perceptual window and the dimensions of space within, as per classical continuity. What is notable about this is that ideas of a reduction in cutting rates in D3D films are over-stated, or at the very least that there is a disconnect between theoretical discussions of D3D and cutting, and actual industry practices. The evidence suggests that most D3D films have cutting rates that are within the range of conventional films; however, there does appear to be a point when the speed of cutting becomes too fast for D3D films. This is a point of difference between conventional and D3D, but hardly significant enough for the claim to be repeated as a general fact.

Needless to say, the parameters of this D3D style continue to include novelty and gimmick, but more often than not these instances are restricted to an overtly self-conscious recognition of D3D and its historic mode of production (that is, an occasional 'in' joke for fans to laugh at and remember that they are watching an entertainment form). The result is that filmmakers continue to play with D3D, and at times this use is often counter-intuitive to the overall goal of an immersive experience. So, while the majority of D3D conforms to the new aesthetic blend, there is a continuation of the older aesthetic as well. D3D visual style can then be said to be a mixture of old and new, continuity and change.

There exists a distinct trend toward integrating D3D into conventional modes of production so that it becomes less of a variant and more of a

continuation of the aesthetic norm. The next chapter explores the ways that D3D is integrated into industry production pathways. In particular, it analyses how funding structures have expanded D3D production into the Australian national cinema industry, an industry that had not participated in stereoscopic production prior to the digital screen period. Chapter Three explores how this new uptake of D3D technology represents a further exploration of D3D technique and visual style.

CHAPTER THREE

D3D's AUSTRALIAN EXPANSION: *THE GREAT GATSBY*

INTRODUCTION

Given that D3D technique and visual style have largely been integrated into conventional modes of production, the various industrial and related factors that shape and expand the use of D3D in different national industry contexts are significant. Exploring these factors is another way to analyse the nature of creative expression in relation to D3D screen technologies. In this chapter, the exploration focuses on the role of government incentives with reference to the Australian context, where they include an interplay of industry production and filmmaking practice with government screen assistance policy, including production incentives intended to support creative expression and industry activities. The argument is made that just as various mainstream D3D filmmakers have attempted to change D3D by integrating it into the classical Hollywood system, government screen assistance policy has also contributed to shape the way that D3D is adopted and integrated. As well, it has helped to expand D3D uptake in different national industry contexts. The expansion of D3D in the Australian national screen industry during the digital screen period is an example of assistance policy relating to creative approaches to screen technology uptake.

Australia's main screen assistance mechanism is the Australian Screen Producers Incentive (ASPI; Department of Communications and the Arts, n.d). Discussion of this policy, its key guidelines, and its uptake frames other issues, problems and ideas that concern D3D production. For instance, it has influenced the way the Australian industry has continued its transition to digital. This transition has important ramifications for enticing productions, such as transnational or runaway blockbuster production, to Australia, particularly in regard to D3D and visual effects (VFX). In the chapter, D3D and VFX are considered to be different but overlapping concerns. They overlap by virtue of a range of factors, including the industry's and stereoscopy's transition

to digital; Hollywood's dominant mode of production, which seeks production efficiencies and cost reductions; production differentiation; and production standards. The ASPI and its key guidelines also frame the ways that D3D production has been taken up by Australian filmmakers. So, while stereoscopy has not been used in the Australian screen industry prior to the digital screen period, D3D has now become a part of the industry and the country's creative expression.

To explore the relationship between screen assistance policy and D3D, the chapter analyses the production of *The Great Gatsby* by Australian *auteur* filmmaker, Baz Luhrmann. The film is an adaptation of F. Scott Fitzgerald's 1925 novel of the same name. Luhrmann's adoption and integration of D3D technology for *Gatsby* represents a means to continue exploring the nature of D3D creative expression. *Gatsby* is Luhrmann's fifth dramatic feature film, but first by the *auteur* in D3D. It is also Australia's first major blockbuster in D3D; a notable D3D adaptation of an admired literary work; and it was supported and influenced by government funding policy. The film illustrates particular characteristics to do with industrial factors that shape and expand D3D use in national industry contexts. As well, it helps to continue the exploration of the relationship between D3D technology and visual technique and visual style, with particular reference to *auteur* and adaptation production.

MARKET-ORIENTED INCENTIVES

Government screen assistance policies, or simply, funding policies, work by incentivising local productions as well as foreign productions, such as runaway mainstream Hollywood films. In the context of these productions, funding support primarily works to defray costs and limit financial risk. According to DreamWorks Animation chief executive officer, Jeffrey Katzenberg (Giles & Katzenberg, 2010), D3D typically adds approximately ten percent to a production budget, or around US$15 million for a *Madagascar* (2005) or a

Shrek film (p. 3; Balio, 2013, p. 37). [51] As such, D3D has led many businesses to take on cost reduction methods as part of their respective business models. Sourcing funding policy is one method of cost reduction that the mainstream industry has typically adopted during the digital screen period. Other methods include the re-location of production to industries with favourable labour practices (such as low overtime pay) and low currency-exchange rates; attempts to decrease technology hardware costs; and the adoption of simplified outsourcing pathways. In general, these methods have resulted in significant changes to the global audio-visual network and, more specifically, to the range of D3D production contexts.

This change to film business is illustrated by the VFX sector. During the digital screen period the scope and size of the sector's workload has increased. D3D (natural and converted) and its integration into the majority of VFX-heavy franchise productions, notably blockbuster event, family and animation films, is one part of a diverse range of interrelated elements contributing to this increase. Another is reflected in the idea that post-production is the final point when an *auteur*, or post-*auteur*, filmmaker, has control of a film's artistic vision (Elsaesser, 2012, p. 285). Rather than lose control of the film's production to the studio, these filmmakers work on complex shots that mix principal photography and post-production work together. In this way, shots are only finalised when the *auteur*, as in Baz Luhrmann on *Gatsby*, has controlled the complexities of post-production work and delivered the blockbuster film, complete, to the studio for distribution and exhibition. The result is, as co-founder and former chief executive officer of VFX company, Digital Domain, Scott Ross (2013), says, VFX budgets have become 'by far the largest line item on tentpole budgets, at times pushing [US]$100 million' (para. 2).

In response, business has acted to reduce VFX business margins on contract work and targeted funding policy options (para. 3). The search for

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[51] Others make different estimates. So for instance, director, James Cameron says D3D costs an extra US$15 million, similar to Katzenberg but with a caveat for more depending on the film and whether it is converted or natural (Thompson, 2011). Director Michael Bay says, '[D3D adds] about US$30 million to the budget' (Fernandez, 2011), and, *The Hollywood Reporter*'s Pamela McClintock (2011) claims it adds on average around US$20 million to budgets (US$12 million to convert).

funding policy typically manifests in two main ways, as either a form of basic outsourcing, where VFX work is simply contracted out to lower cost countries; or as a form of business expansion, which includes the construction of international VFX houses with arms in several countries or as partnerships with local VFX houses.

In correlation, D3D VFX production has shifted away from traditional production centres, namely Hollywood, to other national industries which offer the most attractive financial outlook. This shift has reconfigured the sector. In Hollywood, VFX business has declined, despite the increased work related to digital screen period productions, including D3D productions. Prominent houses, such as Digital Domain Media Group and Rhythm & Hues, have filed for chapter 11 bankruptcy, and a series of high-profile protests concerning the incentivisation of work and exploitation of workers have been staged.[52] These protests include those at the 2013 and 2014 Academy Awards which coincided with an attempt to unionise the Los Angeles VFX workforce (Barraclough, 2013a, 2013b; Ross, 2013; Cohen, 2014). [53] In contrast, growth has occurred in New Zealand, mostly at Weta Digital; in India at Prime Focus; in Canada at Whaley & Whaley, Frantic Films and Soho VFX; in the UK at Framestore, MPC and Double Negative; and in Australia at Rising Sun Pictures, Animal Logic and Iloura. The sector's reconfiguration has meant D3D VFX production has been spread away from Hollywood, and in effect expanded D3D production participation. In this way, the uptake of D3D screen technology is increased in different creative contexts in response to the commercial and industrial needs of film business.

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[52] United States Courts (2016) refers to chapter 11 as a process in which a business is reorganised. It states that 'a chapter 11 debtor usually proposes a plan of reorganisation to keep its business alive and pay creditors over time'. In the case of Digital Domain Media Group and Rhythm & Hues, the reorganisation of business included mass redundancies, loan financing and bankruptcy auctions (Verrier, 2012; Johnson, 2013).

[53] At the 2013 Academy Awards, the winner in the Best Visual Effects category, Bill Westenhofer, who won for his work on the film, *Life of Pi*, via the visual effects company, Rhythm & Hues, stated in his acceptance speech that, 'Sadly, Rhythm & Hues is suffering serious financial difficulties now … I urge you all to remember …'. His microphone was cut before he could finish his speech. Tax credits, currency-exchange rates and labour practices were stated as reasons for Rhythm & Hues fall into chapter 11 bankruptcy (Fritz, 2013). The combination of the award, the protest (which had a slogan reading, 'I want a piece of the *Pi* too') and Rhythm & Hues failure highlighted the difficulties of the industry and also the indifference of sections of Hollywood.

Despite the relationship between funding policy and D3D, the screen technology was not a significant factor in policy construction. Most funding policies active in the digital screen period were created before D3D's introduction (FitzSimons et al., 2011, p. 111; Balio, 2013, p. 37). The UK, Ireland, Australia, Belgium, the Netherlands, New Zealand, and Canada, for instance, each had variations of the same type of policy prior to D3D (KPMG, 2012). Each one attempted to stabilise and grow the respective industry, maintain a flow of local and foreign production, and avoid the destructive troughs in smaller national industries, which commonly force operators to close and skilled labour to seek employment elsewhere. The main avenue to achieving these goals is capital return on funding investment. This return is re-invested back into the industry, which creates a feedback loop whereby productivity and capital growth are co-dependent, and industry goals, such as stability, are subsequently achieved. Cultural, industrial as well as capital returns are ensured by particular structural arrangements, such as expenditure thresholds and employment quotas, which broadly reflect processes of negotiation and consultation with relevant publics, such as peak industry bodies. The added cost and expansion into different industry contexts of D3D production, as in various national industries and production sectors, such as VFX, and the increase in post-production work and costs, for example, would have satisfied these threshold and quota arrangements.

So, although the screen technology was not a factor in policy creation, D3D productions have since claimed incentive funds. D3D filmmakers have co-opted policy, resulting in cultural and industrial exchanges that have driven D3D technology adoption, increased production and enabled filmmakers to explore D3D technique and visual style in unique ways. This use of funding policy has contributed to the expanded use of D3D in the global audio visual network, with particular reference to national film industries that have had little or no history of its production, as in the Australian screen industry.

Australian Screen Production Incentive

Australia's industry is what Tom O'Regan (1996) calls a medium sized national cinema (p. 82). Its size and output in relation to other larger English-language

industries, most notably USA, UK and Canada, have led to the development of the ASPI funding policy (Department of the Prime Minister and Cabinet, 2011, p. 1). Since 2007, the ASPI has primarily attempted to support production by balancing complex cultural and industrial exchanges that exist between the local industry and various foreign industries. In this context, the policy functions with three financial offset incentives, referred to as the Producer Offset (PO), Location Offset (LO) and the Post, Digital and Visual Effects Offset (PDV). These offsets provide financial incentives for local, Australian producers; foreign productions located in Australia; and post-production, digital and visual effects production in Australia. The management of the three is split between Screen Australia, which manages the PO, and the Federal Government's Ministry for the Arts, which manages the LO and PDV offsets. This split is based upon the distinction between local and foreign production so that Screen Australia is concerned with local production while the Ministry for the Arts is concerned with attracting foreign productions to Australia. The distinction has ramifications for the size of the tax offset; that is, the local-oriented PO carries a larger tax offset on monies spent in Australia (40 percent) while foreign-oriented LO and PDV offsets both carry smaller percentages, namely 16.5 percent on monies spent in Australia for the LO and 30 percent on monies spent on PDV related work in Australia for the PDV Offset. Significantly, productions are only eligible for one incentive. This means, for instance, that films that satisfy the criteria for a PO cannot also apply for a PDV Offset. A film that has already claimed a PO and includes a large amount of PDV work, such as *The Lego Movie*, cannot also claim a PDV Offset.

A caveat to claiming an offset is included in each of the three incentives. These are cultural and industrial requirements that largely determine the success of a claim and also contribute to shape how a film is produced. These requirements are the product of negotiations involving the Federal Government; Screen Australia; various industry peak body organisations, which lobby on behalf of their professional members; [54] as well as high profile industry figures,

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[54] A Media, Entertainment and Arts Alliance (MEAA, 2009) fact sheet on the ASPI offsets states this goal in plain language:

including Baz Luhrmann (Van Cuilenburg & McQuail, 2003). In fact, Luhrmann has claimed that he 'was instrumental in organising the [tax] rebate in Australia with the previous Prime Minister [John Howard]' (Dodes, 2013, para. 21). He also claims that he helped guide the Federal Government to look at ways to encourage ex-patriot filmmakers to return to the local industry to work:

> I met with [John Howard] personally and said, 'Look, the issue here isn't how to give a rebate to stories set under gum trees. It's creativity, imagination – people who drive creativity by bringing other creators here and making major works, getting Australians to make their imaginations here, in their hometown' (Dodes, 2013, para. 21).

This is to say, the ASPI was shaped by a range of forces. Luhrmann was particularly interested in seeing the definition of Australian content broadened to take into account a film's subject matter, filmmaker nationality and production location, as well as production expenditure and financial return on industry investment, and industry development, as in education and training for new screen technology use, such as D3D. In terms of the PO's definition of Australian content, productions must satisfy the Significant Australian Content (SAC) test, which, as figure 3.1 shows, relates to these five areas. These guidelines, the focus of Luhrmann's argument, amount to the official definition of Australian content.

> The Alliance [MEAA] wants more jobs for members in the film industry. That is why we are campaigning for better incentives. It's important that the Australian film industry grow by 50 per cent over the next three years, a figure we think is sustainable and will create job opportunities for crew (p. 2).

Other industry peak bodies include the Australian Cinematographers Society (ACS), Australian Guild of Screen Composers (AGSC), Australian Production Design Guild (APDG), and the Australian Screen Editors Guild (ASE).

Requirements	Areas of consideration
The subject matter of the film.	Is the film 'about' Australia or Australians? Does it reflect a cultural background that is particular to Australia or Australians? Does it reveal some aspect of Australia's or Australians background or experience? Is it based on an Australian story? What is the extent to which the film is about Australian characters? What is the extent to which the film is set in Australia? Did the core origination of the project take place in Australia or under Australian control? What is the length and extent of association Australian citizens or residents have had in the film's development? Other relevant factors may be identified which are peculiar to an individual project.
The place where the film was made.	To what extent is the film going to be produced in Australia?
The nationalities and places of residence of the persons who took part in the making of the film	Are the key filmmakers (in particular above the line roles such as the producer, writer, director and lead cast members) Australian citizens or permanent residents?
The details of production expenditure incurred in respect of the film.	What is the extent to which expenditure is made on Australian citizens or residents (expenditure on Australians working overseas is relevant, but expenditure on non-Australians working within Australia is not considered relevant)? What is 'the extent to which expenditure is incurred within Australia (that is, on goods and services provided in Australia)?
Any other matters that Screen Australia considers to be relevant.	Policy issues associated with the Producer Offset, such as the impact of the project on creating a sustainable Australian film and television production industry, or whether it supports the development and employment of Australian key creatives to make Australian films. The extent to which copyright ownership resides with Australians, in particular whether this is commensurate with the proportion of the budget provided by Australians. The extent to which creative control rests with Australian citizens or residents. The extent to which there is recoupment and profit participations to Australian nationals or residents and the extent to which that is commensurate with ownership.

3.1. Significant Australian Content test guidelines (Screen Australia, 2009, pp. 3 – 5) [55]

[55] Official co-productions:

> Official co-productions are an exception to this [SAC test] requirement.
> A film is considered to meet the SAC test if it is approved as an official
> co-production, that is, it has been made under an arrangement entered
> into between the Commonwealth or an authority of the
> Commonwealth and a foreign country or an authority of a foreign
> country, either a co-production treaty or a memorandum of
> understanding (Screen Australia, 2009, p. 2).

This exception notably applies to the stereoscopic film, *Bait* (2012), which was a co-production between Australia and Singapore, or more specifically Screen Australia and Media Development Authority.

The SAC test refers to four main areas, with an additional area that covers a range of relevant possibilities. These areas consider how a film's particular aesthetic relates to Australia; the location of the production; Australian worker employment in key creative roles; and, in much the same as the LO and PDV, the amount spent in Australia. Satisfying the SAC test in these areas means that a film is considered Australian and can therefore claim the 40 percent tax offset. Films that have successfully claimed a PO illustrate how these areas have been administered. Successful PO films include *Cane Toads: The Conquest*, *Legend of the Guardians: The Owls of Ga'Hoole*, *Happy Feet Two*, and *Storm Surfers 3D*. Each film satisfied the SAC test in different ways, but ultimately demonstrated to Screen Australia that they were Australian.

Significantly, as well as looking inward at the various Australian characteristics of production, the SAC test also reflects the various cultural and industrial exchanges with other national industries that commonly take place. It reflects an outward view, where ideas, techniques, and screen technologies are adopted, indigenised, and, as Tom O'Regan (1996, p. 1) stated more generally in an earlier context, 'Australianised'. [56] One such exchange concerns the adoption of D3D by Australian filmmakers. Not originally an Australian medium, stereoscopy has nevertheless been adopted by Australian filmmakers who then approach the screen technology through the prism of their cultural experience. . In this context, another exchange concerns the status of the adopting filmmakers, many of whom are considered to be international *auteurs*, such as Mark Lewis in regard to *Cane Toads*, and George Miller in regard to *Happy Feet Two*. In this respect, the notion of an 'Australian' relates to 'international' styles of production, screen technologies, and internationally recognised *auteur* filmmakers.

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[56] O'Regan's (1996) definition of a national cinema in *Australian National Cinema* is:

> National cinemas involve relations between, on the one hand, the national film texts and the national and international film industries and, on the other hand, their various social, political and cultural contexts. These supply a means of differentiating cinema product in domestic and international circulation: these are the Australian films, directors, actors and these are the French. They carve out a space locally and internationally for themselves in the face of the dominant international cinema, Hollywood (p. 1).

There is an underlying tension in the ASPI between local and foreign, which similarly relates to D3D production. The policy's definition of Australian content has a notably large scope, in particular the fifth guideline which applies to a broad range of potential productions. The report *Getting Down to Business: The Producer Offset Five Years On*, for instance, states that the majority of PO claims have been approved: approximately 500 final PO certificates had been issued up to the date of 30 June, 2012 (Screen Australia, 2012). This approval rate reinforces the industry's position in encouraging both local and foreign production in order to stabilise business (Ryan, 2010, p. 86).

Nevertheless, the process of applying the definition presents a range of contestable outcomes that reflect the tension between local and foreign, and culture and commerce.[57] Director George Miller's 2008 D3D blockbuster film, *Justice League: Mortal*, for example, was rejected on the grounds that the film's subject matter was not Australian; the authors, scriptwriters and basis for the story (that is, DC Comics's *Justice League* series) were not Australian; and a key producer was not Australian. In this instance, the decision not to grant a PO to the production ultimately caused the film's studio, Warner Bros., to re-evaluate its commitment to the production and eventually place the film on 'indefinite hold' (Fleming & Garrett, 2008). Miller later said that 'It was suggested that I was somehow the stooge of the American studio, that I didn't have enough creative control' (Baille, 2008). This suggestion refers to the idea that funding policy, such as the ASPI, act in similar ways to 'maquiladora' initiatives, with basic production tasks fulfilled by local staff while key production control is held by foreign principals. According to Miller, there was a perception that the

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[57] According to Screen Australia (2012a), approximately 500 final Producer Offset certificates had been issued by 30 June 2012, which, along with the Location and PDV Offsets, accounted for almost all production expenditure in Australia. This is despite a number of negative factors, such as the high cost of the Australian dollar, the global financial crisis and the initial difficulties in obtaining the participation of financiers to lend against the anticipated receipt of the Offset (Cole, 2009; Screen Australia, 2012a). '[T]he overwhelming response', according to the *Getting down to business: The Producer Offset five years on* report, '[is] that [the Producer Offset] has had [a] positive influence in helping finance projects and build businesses, not only financially, but also by giving them [producers] a greater stake in the success of their projects' (Screen Australia, 2012a, p. 15).

exchange between local and foreign was unbalanced in relation to *Justice League*, and favoured foreign entities more than the local industry.

3.2. *The Great Gatsby* (2013). Screen capture.

Luhrmann's *Gatsby* (see figure 3.2) offers a similar example, although the production ultimately succeeded in claiming a PO. As for *Justice League*, the *Gatsby* producers' claim also resulted in considerable criticism in the popular press: '*Gatsby* gets caught in row on film funding' (Frew, 2011); 'Secret $40 million windfall for *Great Gatsby* despite no koalas, kangaroos' (Crook, 2011); 'In a flap over the *Great* Subsidy' (Bodey, 2013).[58] In line with this criticism, industry icon and commentator, Phillip Adams (2014), wrote that Screen Australia's decision to award the production a PO contravened the spirit of Australian cinema's 1970s 'revival' (para. 1). Adams also alluded to the issue of maquiladora initiatives by saying that:

> I did NOT support the huge handout to *Gatsby*. And I was appalled by the Ozcars' [2014 AACTA awards] cultural cringing to Baz's bloated and essentially American film. I spent many years getting Australian film-making up and running — in line with the opening paragraph of my one-page report to Gorton that led to its revival: "we hold these

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[58] Worldwide box-office: US$351,040,419. Released in Australia between 30/5/2013 and 11/8/2013 (73 days and 15 weekends across Australian winter school holidays), box-office totalled US$25,282,416 with a per screen average of US$7,913.

truths to be self-evident … it's time to tell our own stories, hear our own voices, see our own landscapes and dream our own dreams." Where does *Gatsby* fit into this? (para. 1).

Certainly, F. Scott Fitzgerald's story set within the cultural excess of 1920s New York about Jay Gatsby (or James Gatz), an American, and his amorous pursuit of Daisy Buchanan, another American, is not normally associated with Australia. *Gatsby* is, after all, known as one of the great American novels, no less because it portrays the upward social mobility of that country's great dream.[59]

Nevertheless, the *Gatsby* production was able to claim a PO in no small way because it answers parts of each of the five SAC test guidelines. Luhrmann, an international 'showman *auteur*' (Cook, 2010, p. 4), made the claim public in a Screen Australia media release by saying that:

> Without the Producer Offset, there is simply no way that we [Luhrmann and wife, creative- and business-partner, Catherine Martin] could have picked up on and continued the creative relationships that have evolved with us in Australia, and that have so enriched our creative process (Screen Australia, 2013a, para. 5).

Although not obliged to make the claim public, Luhrmann chose to make it clear that the PO was a significant factor in the film's production and its Australian location. His statement echoed many of the themes he chose to reveal in earlier statements, particularly that government funding should enable ex-patriot filmmakers to return home to work.

Gatsby's production cycle (from pre-production to completion) is a unique example of the way that D3D production relates to government funding policy. For instance, it illustrates how government incentive policies have affected the growth of D3D production in film industries with little or no experience of D3D production. It shows the ways in which these policies relate

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[59] This is a point made by *Taboo* producer, Mikeal Borglund. He is quoted as saying, 'With *Gatsby*, it is set in New York in the 1920s. So how could you argue it has significant Australian content?' (Frew, 2011, para. 7).

to and shape production, with regard to key cultural, industrial and commercial requirements. As well, it offers a complex example of the way that Australia and Australian filmmakers have come to participate in and develop a new forms and uptake of D3D. In all, *Gatsby* offers insight into the new contexts in which stereoscopic expression in the digital screen period is taking place (a bridge from Hollywood to Australia), as well as the various factors that are shaping these expressions.

ADAPTATION AND D3D ADOPTION

For Luhrmann and the principal crew the initial creative challenge of the production concerned adaptation. This challenge manifested in distinct periods during pre-production: research (or rather, decoding), informed design, and, later, implementation. In many ways, these adaptation periods form the basis on which D3D was integrated by Luhrmann in *Gatsby*, including the initial inspiration and motivation to use D3D as well as its design and its production. An important factor in the process, D3D informs various changes made to Fitzgerald's *Gatsby* story. For instance, the screen technology shaped the way the filmmakers related the story's 1920s period setting to a contemporary audience; the way they expressed, in cinematic terms, the interiority of characters; and the various changes they made to the narrative structure, most notably a new framing device for the story events. These elements have an impact on notions of authorship, transitioning the story from the page to the cinema screen, from Fitzgerald to Luhrmann and crew. As well, they underscore the creative challenge in differentiating a production of *Gatsby* from other remakes and other Hollywood adaptive works.

According to Luhrmann, the adaptation process began in 2004, nine years before the *Gatsby*'s theatrical release, when he embarked on a train journey as a part of 'a debriefing adventure' following the busy exhibition cycle of his film, *Moulin Rouge!*. As he tells it:

> I'd decided to take the Trans-Siberian Express from
> Beijing, across northern Russia, and then on to Paris to

meet my wife and newly born daughter, Lilly (Warner
Bros., 2013, p. 3).

I'd packed two bottles of Australian red wine, plus a couple
of audio-books ... One of those books was *The Great
Gatsby* ... it became like an out-of-body experience for me,
to hear the sheer power of Fitzgerald's storytelling, and his
poetry ... I was suddenly gripped with a passion to make a
movie of F. Scott Fitzgerald's *The Great Gatsby*
(Interactive book, 2013).

In this way, Luhrmann states that he initiated the film and the adaptation
process. This claim is likely to have had an impact on the production's PO claim:
even though the *Gatsby* story was not Australian, 'The imagination to do it, the
vision to do it, [is stated to be] Australian' (Roach, 2013, para. 8). So,
Luhrmann's claim partially answers the first SAC test guideline, 'Did the project
originate in Australia and/or was it developed by Australians ... [and] under
Australian control?' (Screen Australia, 2009, p. 3 – 5). It also marks the first
step in the film's production.

During the same period, the rights to the story were owned by a USA-
based production company connected to Sony Pictures, named Red Wagon. Red
Wagon was in the process of acquiring the rights of the novel from A&E
Television Networks when Luhrmann decided to adapt the novel. [60] The
filmmaker's decision led to a partnership being forged between his Australian
production company, Bazmark Inq., and Red Wagon (and A&E). Significant, in
terms of the SAC Test, this partnership meant that an Australian company
participated in the rights and the development of the production. Moreover, it
meant that Luhrmann and crew had access to the novel in order to continue
adapting Fitzgerald's prose to the screen.

Bazmark established offices in New York during this initial pre-
production period: first in a suite at the Ace Hotel and then later in a building
on the corner of Canal and Broadway in Manhattan (Warner Bros., 2013, p. 4).
The principal filmmakers during this phase of production were Luhrmann,

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[60] A&E had produced a telemovie of *Gatsby* in 2000; the fourth version of the story to be filmed
following screen adaptations in 1926, 1949 and 1974.

Catherine Martin and, screenwriter, Craig Pearce. Their intention was to create a base in the USA for the film's entire production, mimicking the 1926, 1949, 1974 and 2000 screen versions of *Gatsby*. This base was also intended as a point of research where each filmmaker could immerse in USA culture and begin 'to understand the geography [of West Egg and New York]' (Warner Bros., 2013, p. 18).

Research represents a key phase of Luhrmann's adaptation process, which he broadly defines as a period when the original work is 'decoded': 'Any work of literature changed into another medium … you have to *decode* in that medium' (Kendall, 2013, para. 11; my italics). Understandably, many factors shape the outcomes of the decoding process. According to Pearce (Warner Bros., 2013), the crew 'studied maps … [and] stayed in the garment district, which is … a bit like New York would've been in Fitzgerald's time' (p. 18). They also took field trips to various Long Island mansions and to Louisville, 'where Daisy [and Jordan] grew up, and first met Gatsby' (Warner Bros., 2013, p. 6). Research also included the assistance of Professor of English, James L. W. West III (2013), with regard to the formative text, *Trimalchio*, as well as a range of setting, dialogue, costume, and character elements. It was during this research/decoding period that the key creative challenges of adapting *Gatsby* were overcome, in particular distinguishing Luhrmann's version from others as well as reshaping notions of the story's authorship.

Decoding Into D3D

Research into the *Gatsby* story and Fitzgerald inspired and shaped how D3D was adopted and eventually designed and used. The reasons discussed by Luhrmann and crew for D3D's adoption were primarily aesthetic; which is to say financial considerations are said to have been a limited factor in the choice. In fact, Luhrmann says he 'had to convince the studio in the first place that [D3D] was a good idea' (Hogan, 2013; Pennington & Giardina, 2013, p. 193). Artistic, and not financial, concerns were the main motivational force behind D3D's adoption.

Despite this argument, the uptake of D3D nevertheless did provide significant financial benefits, not least because of the return on higher priced D3D ticket sales. These benefits predominantly regard point of difference, that is, the difference between Luhrmann's film and other conventional productions as well as other adaptations of *Gatsby*. This form of differentiation is particularly clear when the use of D3D is considered alongside Luhrmann's status as an international *auteur*. The two combined to make the adaptation unique from Luhrmann's other productions, and provide the film's producers with a means of attracting the classic novel's already established audience to the cinema. In D3D, Luhrmann's *Gatsby* would be an adaptation that fans of the story would never have seen before. As well, the choice of D3D corresponds with the growth of the live D3D opera performance broadcasts in cinemas. Although not an opera, Luhrmann's *Gatsby* had the potential to evoke the theatre and recreate a similar cultural experience to entice the live D3D audience to the film (Higgins, 2010; Verhoeven, 2010, pp. 133 – 154). Undoubtedly, these benefits had an effect on the film's box-office.

The use of D3D is motivated by Luhrmann's response to Fitzgerald's writing; more specifically, it was an attempt to reflect Fitzgerald's exploration of cinematic forms in prose. An example of this exploration is the author's use of a prose equivalent to jump cuts. One instance occurs in *Gatsby* at the end of chapter two. Here, the narrative follows Nick as he leaves a drunken party during which Tom Buchanan has broken Myrtle Wilson's nose. Nick leaves the party with Mr. McKee, a fellow party-goer and man who lives a floor below the party. Nick's narration of the events continues:

> Then Mr. McKee turned and continued on out the door.
> Taking my hat from the chandelier I followed.
>
> 'Come to lunch some day', he suggested, as we groaned
> down in the elevator.
>
> 'Where?'
>
> 'Anywhere.'
>
> 'Keep your hands off the lever', snapped the elevator boy.

> 'I beg your pardon', said Mr. McKee with dignity, 'I didn't
> know I was touching it.'
>
> 'All right', I agreed, 'I'll be glad to'.
>
> … I was standing beside his bed and he was sitting up
> between the sheets, clad in his underwear, with a great
> portfolio in his hands.
>
> 'Beauty and the Beast … Loneliness … Old Grocery Horse
> … Brook'n Bridge …'
>
> Then I was lying half asleep in the cold lower level of the
> Pennsylvania Station, staring at the morning *Tribune* and
> waiting for the four o'clock train (Fitzgerald, 1925, pp. 37 –
> 38).

In the final paragraphs, the narration jumps from an elevator to the downstairs apartment and finally to the Pennsylvania Station. The disjointed ellipses or jump cuts reflect a form of psychological realism in line with Nick's drunken and fragmented memory. For Luhrmann, this innovative, cinematic style of writing had a motivating effect:

> Historically, Fitzgerald was really obsessed with the
> medium of film. He was experimenting with how to write a
> screenplay [and put] cinematic form such as the montage
> and jump cut into his books … [This inspired] me to look at
> doing it in 3-D (Kendall, 2013, para. 11).

That is, by understanding Fitzgerald and Fitzgerald's own influences, the filmmaker was inspired to look beyond conventional approaches to adaptation and to question how he could expand his style of cinematic expression using new screen technologies, such as D3D.

Luhrmann's use of D3D was subsequently couched in terms of his own interests, in particular his interest in an aesthetic that is 'something like the theatre' so that he could see 'actors at top click in 3D, just *acting*' (original *emphasis*; Hogan, 2013; Pennington & Giardina, 2013, p. 193). For Luhrmann, the theatre had been a notable source of inspiration in the past. The 'red curtain' trilogy of films, for instance, similarly looks to the theatre as a source of inspiration to inform its drama. *Strictly Ballroom* (1992) is informed by

Luhrmann's own play; *Moulin Rouge!* (2001) is informed by Verdi's *La Traviata* and Puccini's *La Bohème*; and, of course, *Romeo + Juliet* (1996) is informed by Shakespeare's play, *Romeo and Juliet* (Hillier & Pye, 2011, p. 145). *Gatsby* similarly drew upon characteristics of the theatre, but, as with the red curtain trilogy, the film is made distinct from the theatre via Luhrmann's particular visual style. In general, this visual style is characterised in terms of intensified continuity; or rather 'intense theatricality' which is 'montage-based', and a hyper real style that produces an aesthetic that is 'both nostalgic and ironic' (Hillier & Pye, 2011, p. 145; Cook, 2010, p. 93). His uptake of D3D is an attempt to extend and innovate this style, particularly in relation modes of perception that immerse and distantiate the viewer.

Luhrmann's visual style was a key consideration of the production's D3D design team, which included cinematographer, Simon Dugan; stereographer, Alonso Homs; and a number of PDV teams from post-production houses, such as Animal Logic, Rising Sun, Method Studios, Illoura, Cutting Edge, and so on. This team's approach corresponded to the director's idea to see the actors just acting, as something dimensional, volumetric, like actors in the theatre (Pennington & Giardina, 2013, p. 194). To achieve this aesthetic, the crew used a combination of 3ality TS-5 rigs and Red-Epic X cameras, which shot 120 frames-per-second at 5K resolution. They also used shorter focal lengths, such as 16mm, 32mm, and 40mm, 'rarely going longer than 65mm' (Pennington & Giardina, 2013, p. 197; Gray, 2013, p. 49). According to Duggan, these lenses were chosen to maintain 'a sense of reality … similar to the human field of view, and to use a natural depth of field to give a more immersive experience than possible in 2D' (Pennington & Giardina, 2013, p. 197). During production the crew noticed that conventional techniques of close framing that would typically provide a sense of immediacy in a scene, such as positioning foreground objects to occlude the primary object in order to depict depth, did not achieve either the volumetric goal of Luhrmann's aesthetic or give a sense of immediacy. Results were best achieved when the primary object was positioned as the closest object to the camera. Working in this way, the crew also found that medium shots provided a strong basis for the action, with close-up and extreme close-up shots

generally used to punctuate emotional scenes (Pennington & Giardina, 2013, pp. 196 – 199).

According to the crew, as a result of these technical factors, namely lens choice, composition, shot size, and volumetric D3D, the audience could 'read the subtlest of expressions and look straight into [the character's] eyes' (Pennington & Giardina, 2013, p. 197). It gave the audience greater access to the actor's emotional performance. At the same time, the filmmakers could achieve an opposite effect which they could use to depict moments of disconnect and isolation (Cook, 2013, para. 4). As noted in Chapter One, in these scenes the intimacy is denied. Similar techniques are used, but the image is punctuated with a barrier that disconnects the audience from the character. The two modes of perception, one attempting to immerse and the other distantiate the audience, illustrate a form of spatial tension in the film that corresponds to narrative and temporal characteristics. A notable example concerns the representation of Gatsby, an enigmatic character who maintains an elusive existence in West Egg society, and as both Jimmy Gatz and Jay Gatsby. Luhrmann and crew approach the character by positioning him behind a window or half in clear view and half blurred by lighting (see figure). The result is a thematic use of D3D to produce a form of psychological realism that is similar in tone to that which Fitzgerald produced in the novel.

The choice of lens, shot size, composition and volumetric D3D also provided several technical benefits to the production. There was, for instance, a lower level of disparity between principal object and background. This disparity meant the crew avoided problems in post-production and exhibition, such as ghosting or image bleed. It also meant the problems believed to be associated with cutting in D3D, such as strabismus and amblyopia, which are particularly relevant in regard to Luhrmann's typical fast-cutting style, were reduced.

In regard to this cutting rate, *Gatsby* is noticeably consistent with Luhrmann's other films, including the very low ASL film, *Moulin Rouge!* (see figure 3.3). It has an ASL of 2.66 seconds.
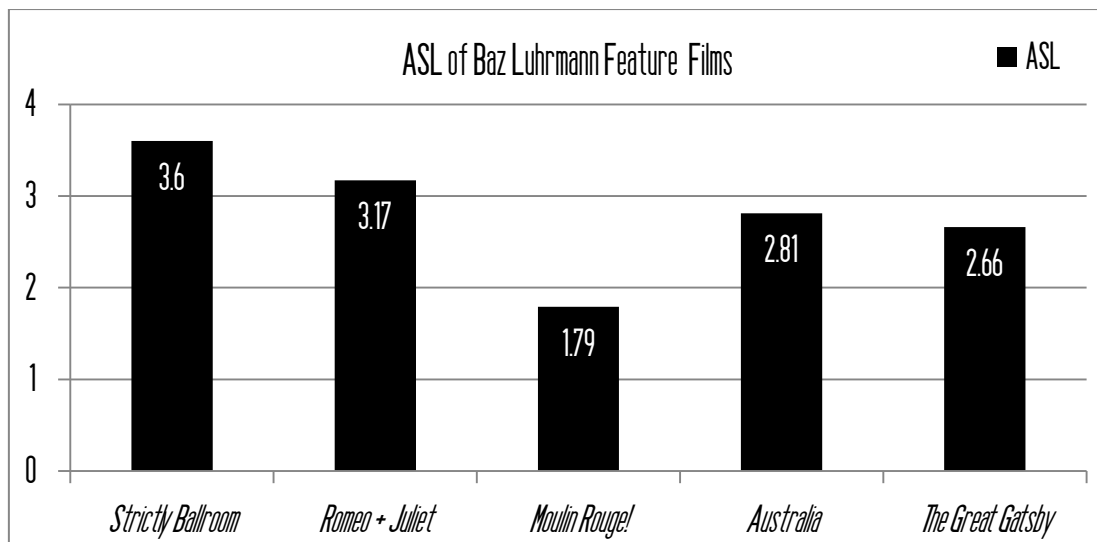
3.3. ASLs of Baz Luhrmann's feature films.

This rate means *Gatsby* is consistent with the trend in mainstream cinema toward a general decline in average shot lengths to between two and four seconds per shot. Figure 3.4 shows this trend in the context of *Gatsby* adaptations, with the exception of the lost 1926 film adaptation. It shows that each subsequent version of the story following the 1949 film version registers a lower ASL than the version before. The use of D3D in the 2013 version appears to have had little effect on the trend, which is to say the decline is consistent not only with the broad downward trend in shot length but also with the view that D3D has a limited impact on cutting rates.
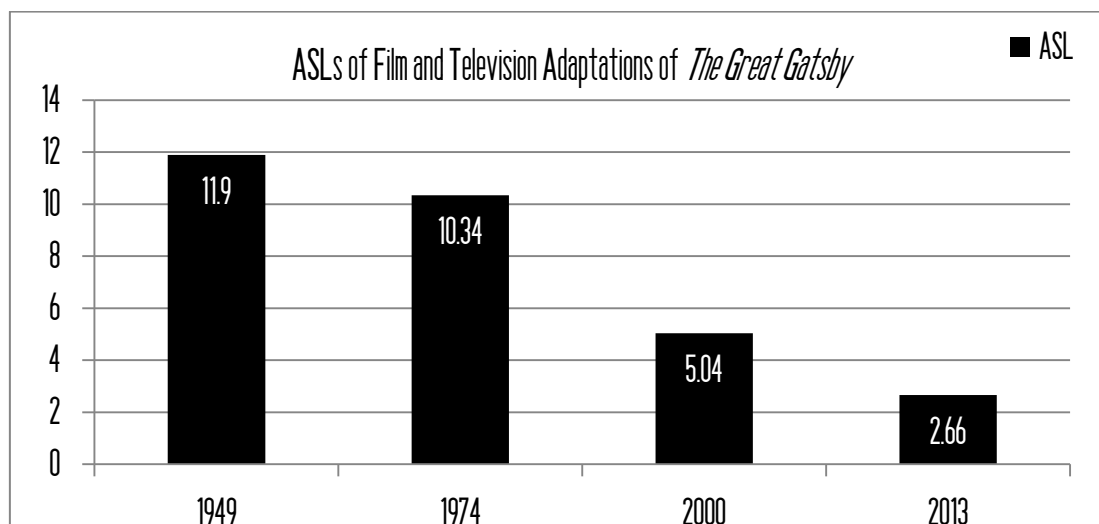
3.4. ASLs of film and television adaptations of *The Great Gatsby*.

The film's cutting rate, in combination with research, D3D design and the other elements of the film's production, ultimately transitioned the adaptation

process to a place where the story and the author's style were assimilated into a new creative context. The authorial control, for instance, moved from Fitzgerald to Luhrmann (the showman *auteur*) and crew. To suit the new creative context of the adaptation, other changes to the original work were made.

1920s and 2010s

One change the filmmakers made concerns the attempt to relate *Gatsby*'s 1920s story setting to a contemporary audience. In Luhrmann's *Gatsby*, the social and economic excess of the 1920s is taken to broadly reflect the social and economic excess of 2000s western culture, with particular reference to the global financial crisis and the interrelated notions of inequality, meritocracy, and inheritance. The corollary of this is that Luhrmann's *Gatsby* acts as analogy while preserving Fitzgerald's key 1920s themes. Speaking in an article for Jay-Z's online magazine, *Life + Times*, Luhrmann (Ohneswere, 2013) explains that:

> because of the shared national hypocrisy of Prohibition (people were railing against alcohol one minute and demanding wine at their table the next), [the 1920s in the USA was a time] that a slight rubbery morality was allowed to flourish, that there was confusion in the national moral dials, so to speak. 1920s New York City was flush with money and booze, the stocks went ever-higher, skyscrapers vaulted to new peaks, and so it seemed that man-kind could only go up. But Fitzgerald – and I think you can see and read this in *Gatsby* and in much of Fitzgerald's work – he can see that something is corrupt morally in society and it is going to come crashing down. And I think to a certain extent we have gone through that ourselves recently. Since 9/11 there has been an added slight moral 'rubberiness' in our world, and we all know that things came crashing down [with regard to the global financial crisis]. And it is this that makes the *Gatsby* story especially relevant today (para. 7).[61]

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[61] Elsewhere Luhrmann has similarly argued that:

> I think that anything that becomes a classic is because it moves through time and geography. Now, what I mean by that is it's relevant in any country and at any time. You know, usually these things are like that because that stories are universal human stories, and we know the people. And *Gatsby* is like that. And so that is the story all of us set out to tell right from the start (Warner Bros., 2013, p. 7).

That is, motivated by what they considered Fitzgerald's intention to show a moral 'rubberiness', the filmmakers attempted to comment on the 2000s by evoking a connection between the two periods.

Making this connection has several repercussions for structural elements of the film. Most obvious is the change to the story's time span. For example, whereas Fitzgerald situates the novel between 1922 and 1924, the film spans the time period from 1922 to 1929 (see figure 3.5).[62] The significance of this is that the story now includes the period directly after Black Tuesday (29 October, 1929). It now depicts the period of excess before The Great Depression as well as the period of crisis directly after: a rise and fall paralleled in Nick Carraway's appearance, firstly, as a happy optimist working in Wall Street, and then as a dishevelled, alcoholic, misanthrope seeking psychological help at The Perkins Sanitarium.
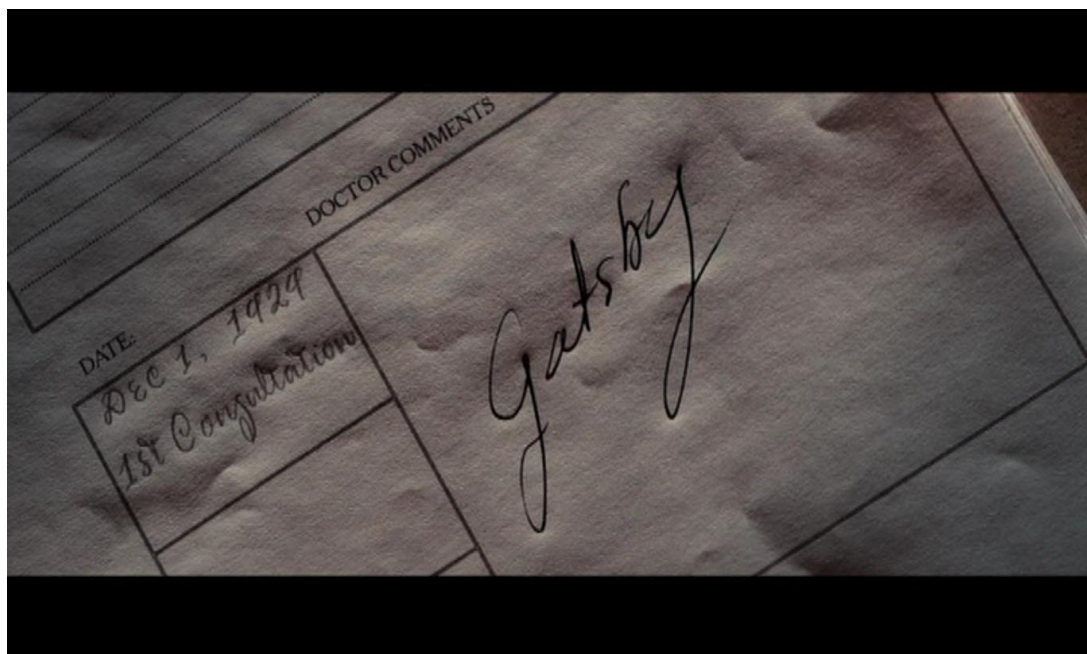
3.5: *Gatsby* is initially set one month and two days after Black Tuesday (1st of December 1929).

While this does not explicitly connect the film's events to the contemporary period and its own social forces, the connection is made overt by Luhrmann's visual style which is simultaneously 'nostalgic and ironic' (Cook, 2010, p. 93). The effect is to blur the two time periods together. This time blur is illustrated in

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[62] The time-span also features in the 1949 version.

the production's targeted aesthetic choices, such as the use of soundtrack music which sonically weaves between the 1920s jazz-age and contemporary hip-hop, at times blurring the two in the jazz-infused productions of Will.I.Am's *Bang, Bang*, and Fergie's, Q Tip's and GoonRock's *A Little Party Never Hurt Nobody (All We Got)*.[63] It is also made clear in the blend of 1920s stock footage and film style, such as superimposed imagery (see figure 3.6) and two-colour Technicolor, and flapper and art-deco costume and design (see figure 3.7), which contrast against the film's use of digital screen period production characteristics, such as digital photography, computer generated imagery, ride film sequences (see figure 3.12), and lower average shot lengths. In this context, the use of D3D stands out as a technological effect which recalls the past, in particular the exploration of stereoscopic production in Hollywood during the 1910s and 1920s, while simultaneously positioning the film in the digital screen period (as director, Martin Scorsese, similarly attempted in the film, *Hugo*, by merging a 1930s Paris setting and D3D together).


3.6: A superimposed image (a reference to 1920s style): 'Wall Street boomed a steady golden roar'.

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[63] This also applies to other areas of the film. Miriam Ross (2013) says that:

> The aesthetic for the logos and the surrounding borders is 1920s Art Deco and the stylistic time period for the film is referenced in a somewhat nostalgic manner. As the opening continues, the frame expands from a 4:3 looking ratio to a widescreen (para. 2).

In particular, the 4:3 (or 1.33:1) and 2.35:1 ratios are indicative of the two time periods.
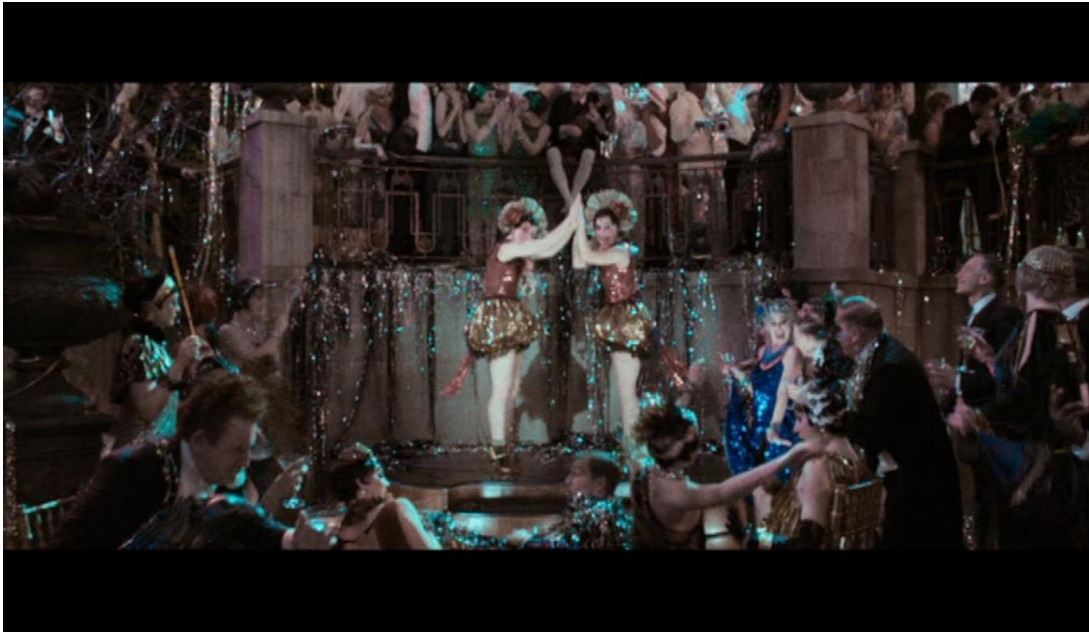
3.7: Red and green colour palette, which is indicative of the two-colour Technicolor process, is used in relation to the art deco and flapper design.

The duel periodisation of the film is similarly evoked in the use of writing on the screen. Luhrmann treats the writing as a thematic element, which Pam Cook (2014) says is 'associated with memory and loss'. Writing appears on screen during scenes when a character experiences emotional highs, as in Nick's participation in Tom's party with Mr. McKee, and during deep lows, as in his state of mind later in the story following Gatsby's death. The effect is one of reflection, conflict and isolation, a form of psychological realism illustrated by moving particles in D3D. In the broader context of media production and the transition to digital forms of production the presentation of 'earlier means of writing' becomes 'profoundly nostalgic' when situated in a digital production (Cook, 2014). In other words, Luhrmann uses writing on screen to contrast the periods where one is linked to an older analogue age and the other distinctly present. It all contributes to juxtapose and connect the periods. So, even though the film is set in the 1920s, the film feels 'modern, of the moment' (Hogan, 2013, para. 13).

3.8: Moving particles. As Nick's world falls to pieces his subconscious is writ large over the city.

The use of writing on screen also highlights the notion of authorship. The film is a Baz Luhrmann production which is adapted from an F. Scott Fitzgerald novel. The combination of names provides a notable point of difference, one that alludes to a higher form of art: on the one hand a showman *auteur* and the other a key figure in 20th century literature. This writing re-positions Fitzgerald on screen. His words are privileged by Luhrmann via a combination of D3D, aerial perspective composition, and moving particles (see figure 3.9), which make them stand out in the frame and in the course of narrative events, notably Nick's depression following Gatsby's death. . The cumulative effect is a layering of extra meaning, including a depiction of Nick's state of mind, a blurring of analogue and digital media, as well as an appreciative nod from *auteur* to author.

Framing D3D

Informed by the choice of D3D, another significant contribution the filmmakers made to the story regards the opening and closing chapters. Their intention in making these changes was to solve one of the primary difficulties of adapting *Gatsby* to the screen, the dual role of Nick Carraway: Nick is narrator and actor in the story (Desmond & Hawkes, 2006, pp. 245 – 246). According to scholar, Bruce Jackson (2009):

You don't *see* Nick Carraway in F. Scott Fitzgerald's novel, published in 1925; he's the character *doing* the seeing we're reading about. But Nick Carraway is a character up there on the stage or screen just like any other in the 1926 stage play, the 1999 opera and the 1926, 1949, 1974 and 2000 films (para. 18).

In other words, the Nick Carraway character is difficult to adapt precisely because he frames the audience's view of the story while also acting as a key participant in the events of the story. As Jackson points out, this dual role is particularly problematic in visual representations of the story where the points of view of the narrator and the participant conflict with each other. For Luhrmann, the solution is to re-contextualise elements of the story so that the narrator and participant roles merge.

In the previous versions of the story, similar attempts are made. Various parts of Fitzgerald's novel are omitted or simplified by filmmakers in an attempt to re-focus the story; emphasising motivating elements and changing various character-traits. In the 1949 version, for example, Gatsby is depicted as a gangster (see figure 3.10) rather than an enigma in turmoil over a lost love. He leads a small group of reprobates, runs prohibited alcohol, murders his rivals, and attempts to seduce Dan Cody's wife. These changes subsequently legitimise the character's eventual downfall, a characteristic that skews the story's message toward an unambiguous moral outcome that by-passes much of the discussion of the great American dream. Undoubtedly influenced by Joseph Breen's application of the Hays Code, in the end Jay Gatsby gets what he deserves.

3.9: 1949 version presents Gatsby as a gangster. In this version, Nick introduces Gatsby by saying, 'Out of the twenties, and all they were, came Jay Gatsby, who built a dark empire for himself because he carried a dream in his heart' (Nugent & Maibaum, 1949).

Faced with the problem of presenting Nick Carraway, the 1949 version similarly employs a framing device. This device is situated at Gatsby's gravesite (see figure 3.11), and initially has Nick and Jordan walk to the site and then away from it at the end, so that it also provides circular narrative structure. Gatsby's gravesite motivates the story's action. Nick recounts the characters and events that led to Gatsby's demise to Jordan Baker, who in this version plays a limited role in the story's events. The device succeeds in contextualising Nick as an active participant, partnering Jordan to the gravesite, and also the narrator, recounting the story to her.

3.10: Nick, with Jordan Baker, reflects on the events that led to Gatsby's demise. In the 1949 version, Nick does not leave Jordan; instead she follows Nick back to the mid-west.

In a similar way, Luhrmann and Pearce's script employs a similar framing device, although in this instance D3D is included as a key transitional effect that bridges and blurs the narrator and participant roles together more harmoniously. The film's opening sequence begins by acknowledging the cinema environment. A black and white projector light that references the story's periodisation intermittently flickers with various scratches and imperfections. Company logos appear and disappear, each one cast in the film's K.H. Schaefer-style design. The sequence then transitions to a digital colour image with a green light in the centre of frame. As well, the Schaefer design becomes distorted so that each line illustrates receding planes of depth. The transition into the story has begun, from cinema environment to a story world that is cast in three-dimensional space. At this point in the film, Nick is introduced as a recovering alcoholic at a sanitarium. His doctor asks him to reflect on how he came to be ill. This allows the filmmakers time to introduce the key features of the story, such as his modest arrival at West Egg, his house next to Gatsby's mansion, and his connections to Daisy and Tom Buchanan. Moreover, it provides a forum to interrogate one of the film's questions, 'How did Nick end up in the sanitarium?' In many ways, this is similar to the route taken by the 1949 version, although instead of a gravesite, there is a sanitarium; instead of Jordan Baker, the screenwriters introduce a doctor character (Dr.

Walter Perkins) to elicit Nick's version of the story; and instead of Gatsby, and how he died, the focus is placed on Nick. Once introduced, Luhrmann and Pearce's adaptation then moves away from the typical framing of the *Gatsby* story. Nick stops recounting the story to the doctor, saying it is too painful to speak about. This moment prompts the doctor to suggest that Nick should write the story down: 'Whatever words you need: a memory, a thought, a place … write it down'.[64] Nick becomes the narrator of the events, and the narration becomes a complex, internal monologue that is adapted for the screen and projected outward by Luhrmann and crew with various flourishes of D3D. Nick's character arc, which ultimately explains the early reference to the Perkins Sanitarium, is illustrated by the uptake of D3D. For example, when he explains the social and moral climate of New York in the early 1920s at the beginning of the film, Luhrmann punctuates the scene with various visual references, including a showy vertiginous ride film drop that ends on Nick (see figures 3.11 and 3.12). Later, when Nick's internal struggles colour his description of events following Gatsby's death, as noted above (see figure 3.8), his diary entries appear on screen and rain down from top to bottom, depicting planes of depth on screen. Luhrmann's use of D3D is to show the character developing from a point of superficiality to one of intimate and internal reflection, leading to the feelings of loss and depression that are described at the beginning of the film. The approach toD3D then becomes a way for Luhrmann to contextualise and combine the two roles, participant and narrator.

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[64] According to Jon Reiner (2013), 'The sanatorium is a shrewd fealty to the author's biography: Fitzgerald's wife Zelda was institutionalised, and he himself suffered from debilitating alcoholism. The sanatorium is named "Perkins", invoking the surname of Fitzgerald's legendary editor at Scribner's, Max Perkins' (para. 8). The film's website also references Perkins in relation to The Perkins Sanitarium. The quote reads, 'Just get it down on paper, and then we'll see what to do with it' (Warner Bros., 2013).

3.11: Luhrmann illustrates the heights of the period with a stunt plane over Manhattan at the same time as he also contextualises the period's dramatic fall.
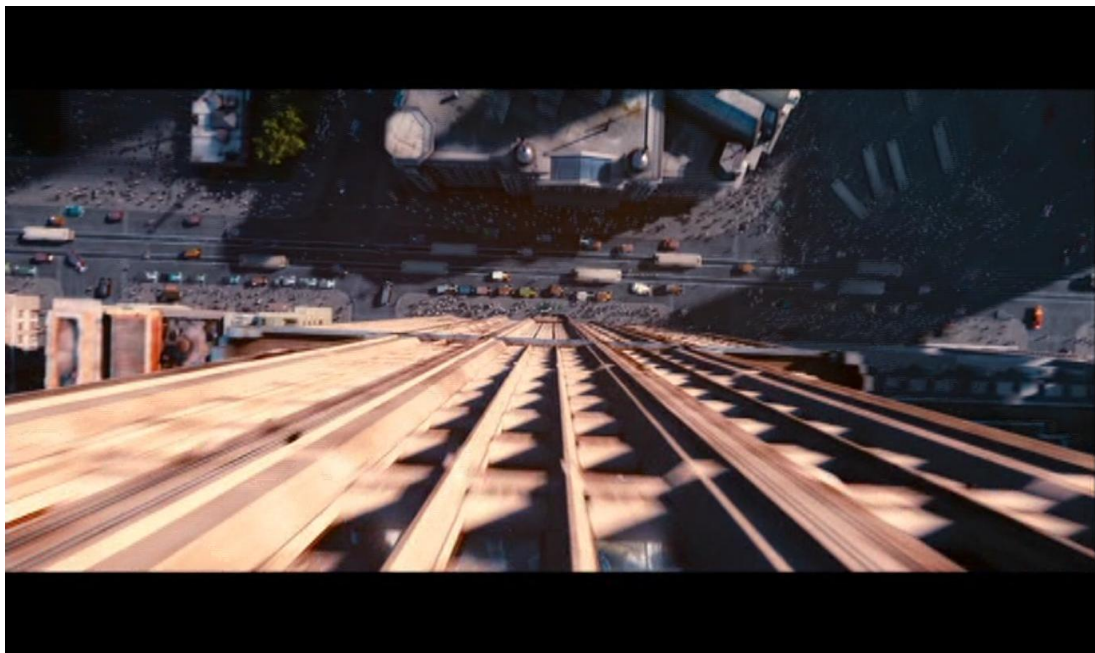
3.12: A vertiginous drop with ride film (with linear perspective composition) aesthetics.

More broadly, the framing device acts to situate the story within the dominant D3D narrative form. That is, in the scenes where Nick is situated at the sanitarium, the storytelling is framed from the point of view of an objective observer, cast in the present tense. What the audience is offered here is the point of view of an independent narrator, a third-person. It is only when Nick begins to reflect on the past and then write his point of view that a subjective reality is used, whereby the story's key illusions are depicted and discussed,

such as the title character's transformation from a 'dirt poor' farmer's son, named Jimmy Gatz, to one of the richest men in New York, named Jay Gatsby. This transition means that the audience is positioned to follow Nick on his subjective journey, as he relives the days and events leading up to Gatsby's death. The combination of film techniques, in particular volumetric D3D, employed by the filmmakers to depict a form of intimacy effectively helps to position the audience alongside Nick on this journey. The 'viscous space' of West Egg becomes a place that the audience might also explore and inhabit. Consequently, the film's scenes depicting an objective reality (that is, Nick in the sanitarium) reflect the narrative form's actual reality, while the movement into the subjective account of the story (the main events of the film) act as an immersion into the alternate reality.

The framing device, although similar to the 1949 version, is argued to have been motivated during the pre-production decoding period. According to Luhrmann:

> Craig [Pearce] and I really struggled with [the Nick Carraway character] … We were very lucky to engage with Dr. [W. Walter] Menninger, whose family were some of the earliest advocates of progressive psycho-analysis techniques in the States, as far back as the 1920s, and it was an explosive moment for us when Dr. Menninger explained that it was very reasonable to think that patients would have been encouraged to come to terms with their experiences through self-expression, writing for example. And then came the bombshell. We discovered that in Fitzgerald's notes for his final novel, *The Last Tycoon*, he intended to have his narrator writing the book from a sanitarium, and the Doctor 'device' and Nick's narration grew from there (Warner Bros., 2013, p. 11).

The idea aligned the film with the novel and novelist much more closely than in previous versions, as the use of writing on screen goes some way to suggest. The result is that filmmakers avoid many of the difficulties of portraying Nick Carraway. Nick's recollection of the events simultaneously reflects Fitzgerald's 'unseen' narrator by actually documenting the events of the story, while at the same time it shows the character forming relationships and playing his part.

3.13: The author, the narrator and the participant become one.

The new portrayal is another example of Luhrmann and Pearce simultaneously acknowledging Fitzgerald's work while also highlighting the fact that it is their adaptation, where the demands of the medium require a slightly different telling (see figures 3.13 and 3.14). The Nick character is undoubtedly a proxy of Fitzgerald, the narrator of the events, as well as being a proxy for the audience, a voyeur of the events.[65] However, by changing the story and including this framing device, Luhrmann and Pearce essentially expand who the Nick character is a proxy of: as well as Fitzgerald, he is also a proxy of the new authors, primarily Luhrmann. So, for instance, in changing the story, they also changed the notion of authorship.

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[65] In Chapter three of *Gatsby*, Fitzgerald (1925) depicts Nick as the documenter of the events when the character writes, 'Reading over what I have written so far I see I have given the impression that the events of three nights several weeks apart were all that absorbed me' (p. 50).

3.14: Playing with Nick's point of view; the establishing shot.
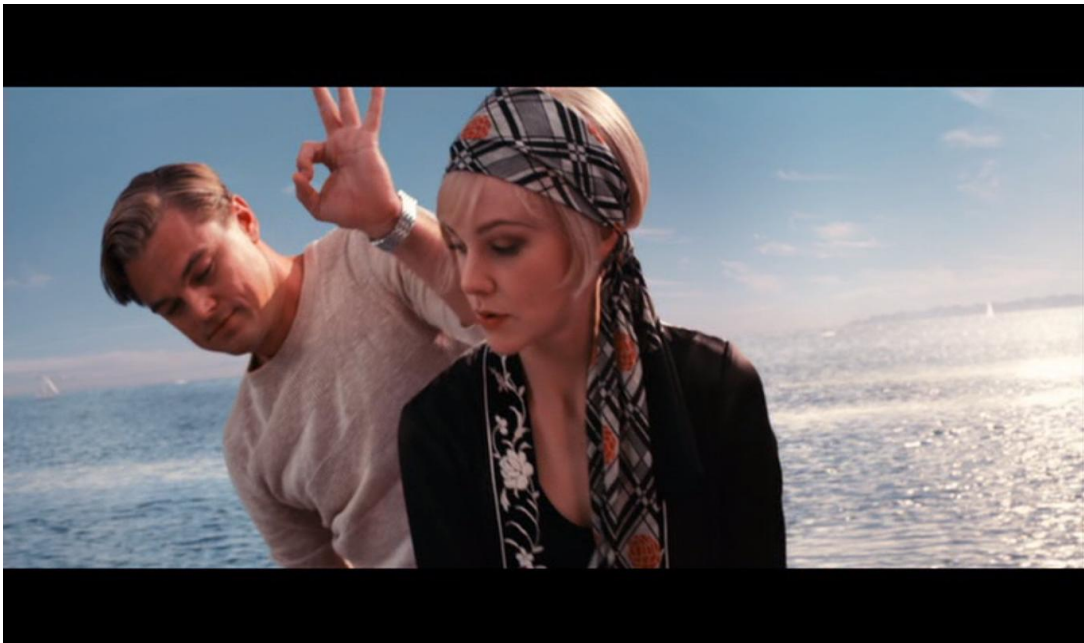
3.15: Nick's view of Gatsby and Daisy; the reverse shot.

The changes are then significant on a number of levels: aesthetic, technological, and financial. The adoption of D3D, one of the changes made by the filmmakers, was used to inform many of the creative solutions for *Gatsby*'s adaptation. In regard to government funding, the changes highlighted the ways that the film aligned with the specific SAC test requirements. *Gatsby*'s production represents a different national industry context in which D3D is taken up and an atypical form of D3D production, literary adaptation, in which the screen technology is creatively approached. The result is an example that

broadly illustrates the way that digital screen technology enables different forms of use.

INDUSTRIAL AND COMMERICAL FACTORS

The inspiration to adapt *Gatsby* as well as the motivation to adopt D3D were part of a larger mix of factors shaping the production, including some notable industrial and commercial interests. The SAC test, for instance, required further evidence of the industrial benefits that the production would bring to the Australian sector: where was the film to be located? How much was to be spent in Australia? How many Australian nationals will make up the principal crew? As well, the choice of D3D had ramifications for the film's budget, in particular for the film's producers and financial supporters: the studio's cost-to-profit ratio was significantly changed. So, while the creative processes of story adaptation and D3D adoption were proceeding, the corresponding financial and industrial processes of production were uncertain.

One of the more significant changes to the film occurred during pre-production. Sony Pictures, *Gatsby*'s initial financial backer, began to withdraw from the film (Horn, 2013). The studio wanted to reduce the size of the budget to around US$80 million and also to defray costs by finding other funding partners (Galloway, 2013). The move disrupted the production's delicate balance and prompted the producers, namely Luhrmann, Martin, Douglas Wick, Lucy Fisher and Catherine Knapman, to shop the production around and look for other funding options. Eventually they settled with the joint venture, Warner Bros. and, Australian company, Village Roadshow Ltd., which has a significant history of funding, producing and distributing films in the Australian film industry.

The switch to the Australian-oriented joint venture coincided with the production relocating to Sydney, Australia, where various elements of pre-production, such as location scouting and set design, and the majority of production and post-production would take place. The move meant that the production, which now had a stronger answer to the second SAC test guideline

('The place where the film is made'), had a better chance to claim a tax offset: approximately US$80 million (Galloway, 2013).[66] The changes are likely to have been inter-related with each one motivating the other: the change to the joint venture motivating a PO claim, the claim motivating the re-location, and so on. In a curious corollary, by claiming the PO Warners and Roadshow and the film's producers were essentially mimicking Sony's initial attempts to defray costs. As a result, the circumstances of the production changed but the funding strategies, albeit via a public screen agency which acted to draw the production away from Hollywood, stayed the same. The ASPI was an alternative avenue of funding the choice of D3D.

In general, the production's relocation meant that the ASPI and Screen Australia had a role in shaping the design of *Gatsby*. Rather than being limited to financial aspects of Australian production as a basic tax offset, the PO also acts as significant factor in the creative development of production. In this instance, it was a factor in Australia's first blockbuster D3D film, given the issues the *Gatsby* production was experiencing regarding financing. The scope of influence that the PO has is discussed only briefly in Screen Australia's (2009) *Guidance on Significant Australian Content* text. The text states:

> A film would have a weak claim in relation to [the second guideline] if the majority of principal photography is not undertaken in Australia. The higher the proportion of production activity in Australia, the stronger will be the claim against this matter. If a film is to be mostly shot offshore, the film will need to have strong claims in the other matters, particularly 'the subject matter of the film' to satisfy the SAC test (p. 4).

That is, if filmmakers wish to receive funding they would need to tailor elements of the production to suit the SAC test. The implication is that the SAC test has

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[66] The amount has been reported at various times as being around US$105 million. This figure only represents a net total figure of the budget, that is, the total budget once the Offset and other local incentives have been deducted (Box Office Mojo, 2013). The gross total, or actual budget once financial incentives are factored back in, was around US$190 million. That means Screen Australia's financial commitment to the film represented around US$75 to US$80 million. Either way, as Catherine Knapman (Warner Bros., 2013) states in the film's production notes, 'Filming in Australia brought a lot of advantages [to the production], including generous incentives from the Australian and New South Wales governments' (p. 19).

creative ramifications for production, not just financial, which is particularly significant when considering the cost of D3D.

Another example of this influence regards the third SAC test guideline, which relates to the nationalities of the principal filmmakers. As for the location of the production, the greater the number of Australians in the key roles strengthens the production's claim.[67] *Gatsby*, now re-located to Australia, reflects a strong response to the third guideline. Over half of its key creative roles are filled by Australians or people with Australian residency. This includes an Australian director, an Australian writing partnership, six of the nine producers, and a significant Australian presence in the roles of cinematography, editing, and acting (see figure 3.15).

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[67] The lead actors and department heads, such as cinematography, editing, costume and music, are understood to play a lesser role in the estimation of Screen Australia.

Name	Role (company/character)	Nationality
Baz Luhrmann	Director/Producer/Screenwriter (Bazmark Inq.)	Australian
Catherine Martin	Producer/Production Design/Costume Design (Bazmark Inq.)	Australian
Douglas Wick	Producer (Red Wagon)	USA
Lucy Fisher	Producer (Red Wagon)	USA
Catherine Knapman	Producer (Bazmark Inq.)	Australian
Shawn 'Jay-Z' Carter	Executive Producer	USA
Bruce Berman	Executive Producer (Village Roadshow Pictures)	USA/Australian
Anton Monsted	Co-Producer/Executive Music Supervisor (Bazmark Inq.)	Australian
Barrie Osborne	Executive Producer	USA/Australian
Craig Pearce	Screenwriter	Australian
Simon Duggan	Director of Photography	Australian/New Zealand
Jason Ballantine	Editor	Australian
Jonathan Redmond	Editor	Australian
Matt Villa	Editor	Australian
Craig Armstrong	Music	UK
Leonardo DiCaprio	Actor (Jay Gatsby)	USA
Tobey Maguire	Actor (Nick Carraway)	USA
Carey Mulligan	Actress (Daisy Buchanan)	UK
Joel Edgerton	Actor (Tom Buchanan)	Australian
Elizabeth Debicki	Actress (Jordan Baker)	Australian
Jason Clarke	Actor (George Wilson)	Australian
Isla Fisher	Actress (Myrtle Wilson)	Australian
Jack Thompson	Actor (Dr. Walter Perkins)	Australian

3.16: Nationalities of key creative roles in *The Great Gatsby*. The roles highlighted in grey are specific requirements of the SAC test, while the remaining names are of secondary importance.

In addition to these roles, the film's principal photography included over 800 local production jobs. Post-production work included a series of Australian, or Australian-based, production houses, such as Animal Logic, which contributed 590 VFX shots to the production,[68] Rising Sun (123 VFX shots), Method Studios (150 VFX shots),[69] Iloura (around 100 VFX shots), Cutting Edge (contributed digital intermediate, colour grade and optical work), and Stage One Sound (contributed dialogue, music and FX sound mixing. Warner Bros., 2013, p.

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[68] Animal Logic was the lead VFX company on the *Gatsby* production. It contributed 590 VFX shots.

[69] Method Studios also provided 3D conversion work to the production.

19).[70] In other words, *Gatsby* represented a considerable boost to the Australian film industry, in particular the VFX sector.

A total of 1,449 shots from *Gatsby*'s 2,902 shots were digitally manipulated in some way (Failes, 2013). That is, VFX was an important part of the production as well as the D3D. Understandably, the bulk of the VFX shots were to do with the shooting location of Sydney, Australia, in the 2010s, and its conversion into New York, USA, in the 1920s, a fact that illustrates the flexibility that the transition to digital gives to a large production.[71] In addition, the VFX crews needed to redesign New York (Failes, 2013). Animal Logic, the film's main VFX house, in fact built a low-resolution version of New York that was based on photos and maps taken from the period (Failes, 2013). The Logic team built 20 buildings and 'redressed them', according to visual effects supervisor, Andy Brown (Failes, 2013). The buildings were redressed using 2.5D matte paintings, which is a combination of two-dimensional images and three-dimensional animation. The combination of digital technologies highlights the fact that D3D is often produced in relation to other technical and visual effects devices that build massively detailed fictional worlds. This detail is notably cast in a reel of VFX work posted online by Animal Logic visual effects supervisor, Chris Godfrey. It shows a 'before and after' comparison of *Gatsby* VFX shots which make Sydney look like New York (see figures 3.16 and 3.17). In particular, Godfrey's reel demonstrated why productions, such as *Gatsby*, could afford to move production away from Hollywood.

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[70] ILM in San Francisco, and Prime Focus in Vancouver, London and Mumbai, were also contracted for post-production work.

[71] The scope of the VFX and its nature in converting Sydney to New York led the design and technology blog, *Gizmodo*, to aptly title an article, 'Everything You Thought Was Real in *The Great Gatsby* Was Visual Effects' (Liszewski, 2013).

3.17: *Before* (Godfrey, 2013).

3.18: *After* (Godfrey, 2013). According to Brown, 'All the individual lights were modelled. Animation-wise, we [Animal Logic] colour-coded them so each bulb would be a different colour and then we'd space them out – red, green, blue, magenta – so we'd figure out the animation clockwise and we'd sequence the colour around the edge of the border' (Failes, 2013).

In general, this VFX (or, rather PDV) work illustrates the broader significance of the ASPI in motivating *Gatsby*'s re-location and its connection to the local industry. That is, it is unlikely that the film would have been made in the same way in D3D without the ASPI. Sony's attempt to reduce costs, the production's move to Australia and subsequent PO claim, as well as the PO's

influence on the cast and crew, demonstrates the many ways that the global audio-visual network is being reconfigured in the digital screen period. The significance of D3D in this instance is causal: it prompted changes, such as attempts to reduce costs, which ultimately lead to Australia's film industry integrating itself into D3D production with its first blockbuster D3D film.

THE RETURN ON INVESTMENT: FEEDBACK LOOP

This chronology of events highlights the fact that the ASPI (and PO and SAC test) creates a feedback loop. That is, ASPI funding eases the burden of production costs – including D3D – which opens the way for a film to be relocated to Australia. In return, the government policy achieves film industry and sector employment. The capital return from this productivity is then re-invested into the industry and other D3D productions in the form of tax offsets, which creates a positive feedback loop whereby productivity and capital growth are co-dependent. This loop notionally stabilises the industry, giving it a foundation on which to grow.

Factors other than location, employment, and so on are also relevant to this feedback loop, including the timing of the production's principal photography and its corresponding value to the film industry. *Gatsby*'s principal photography, for example, took place over a period of time (5/9/2011 to 22/12/2011) when the Australian dollar was nearing a position of parity or more with the USA dollar (USD). This relative position had ramifications for production's relocation to Australia, its overall cost, and the return on Screen Australia investment. The period and the relative pricing of the Australian dollar are illustrated in figures 3.18 and 3.19; the latter graph also including a comparative rival to Australian foreign production, New Zealand.
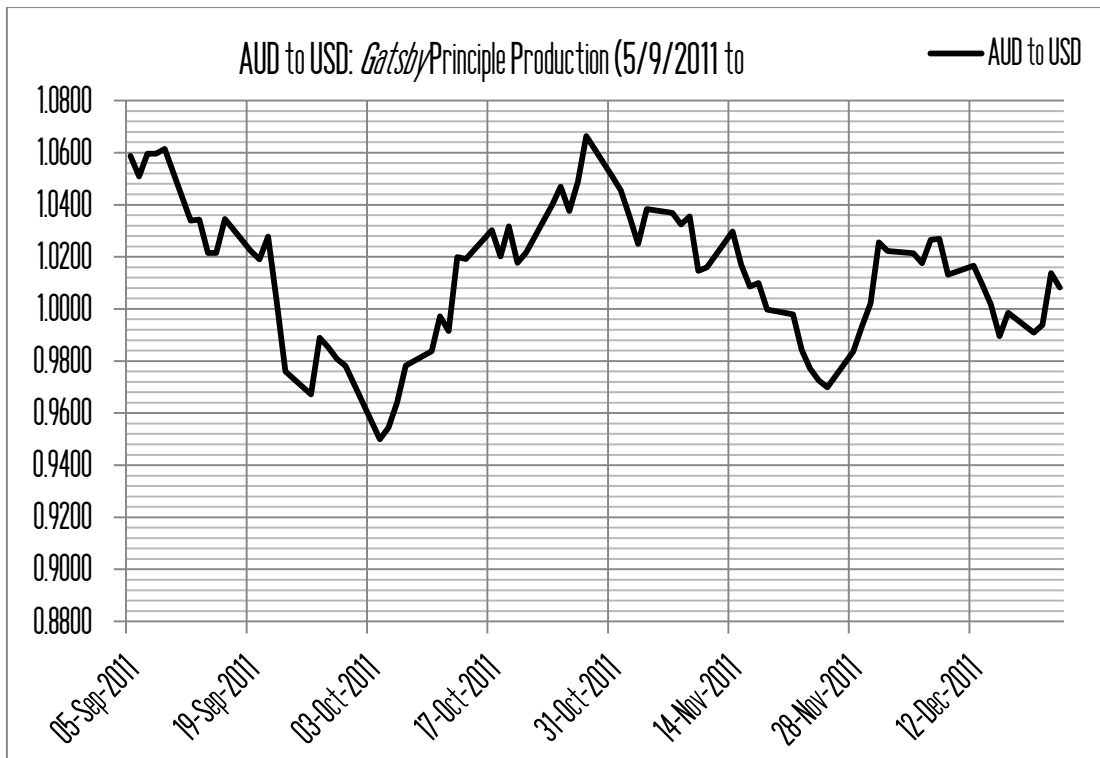
3.19. AUD data, sourced from RBA, 2014, shows the value of the Australian dollar (to the USA dollar) over the period of *Gatsby*'s principle production (5/9/2011 to 22/12/2011).
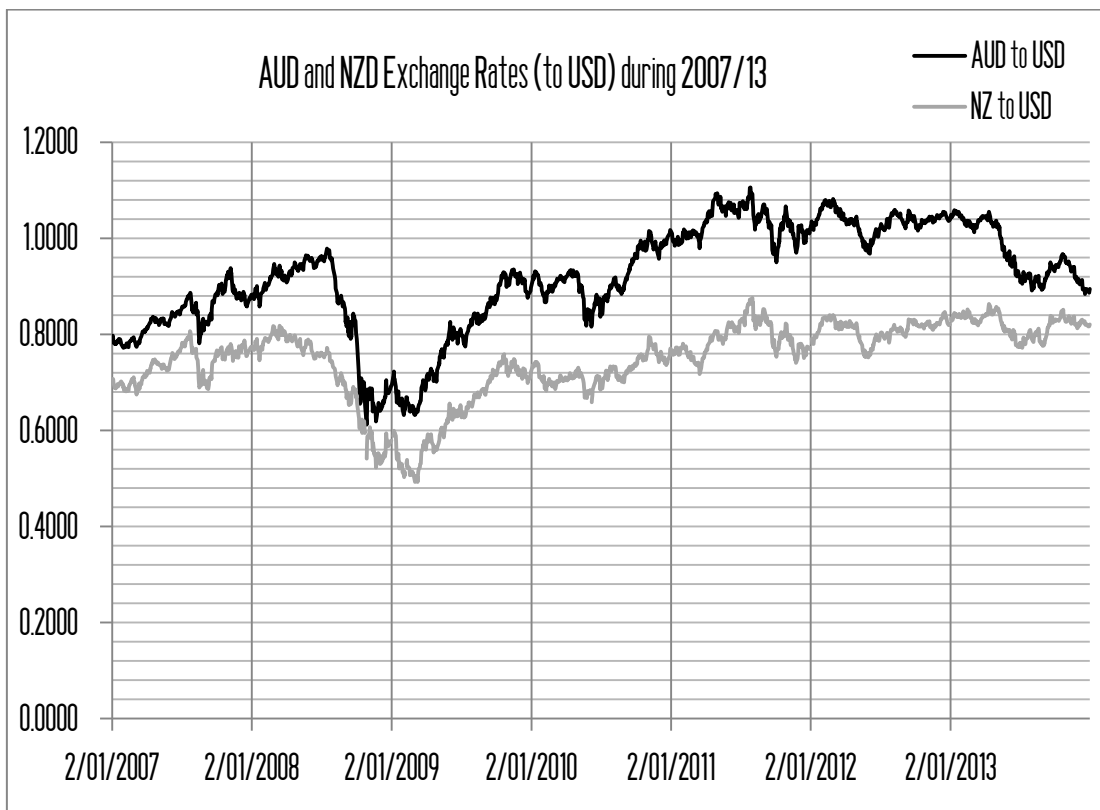
3.20: A comparison of the AUD and NZD to USD exchange rates, sourced from the RBA and RBNZ, 2014, over the 2007 to 2013 period. The comparison with the NZD demonstrates one of the options open to economic runaway productions (RBA, 2014; RBNZ, 2014).

For D3D production, the higher dollar meant a higher cost of production, including paying more for equipment. More broadly, the high dollar value led to a decrease in foreign investment, local and foreign film production as well as production expenditure (see figures 3.20 and 3.21). The decline is reflected in the 2010/11 period that preceded *Gatsby*, when the only major PO and LO productions were *Tomorrow When the War Began* (2010), *The Chronicles of Narnia: The Voyage of the Dawn Treader* and *Don't Be Afraid of the Dark* (2011). Using production spend as a measurement of productivity, this period totalled just $89 million, a difference of $279 million and $207 million when compared to the relatively strong periods of 2008/09 and 2011/12, respectively (Screen Australia, 2012a; 2013b; 2013c; 2013d).[72]

Australian Feature Slate 2007 to 2013		
Year	No. Films (Offset)	Spend $m. (Offset spend)
2007/08	38 (19)	172 (106)
2008/09	39 (24)	368 (359)
2009/10	42 (30)	273 (265)
2010/11	21 (15)	89 (88)
2011/12	28 (28)	296 (296)
2012/13	39 (n.p)[73]	358 (n.p)

3.21. Australian feature slate 2007 to 2013 (Screen Australia, 2012; 2013b; 2013c; 2013d).

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[72] A notable contributor to the 2008/09 Australian feature slate spend was Luhrmann's production, *Australia*. The economic data concerning PDV work are 'assigned to the year it [PDV spend] was earned rather than allocated to the start of the shoot or PDV in Australia' (Screen Australia, 2012a). As a consequence, this figure does not include *Gatsby*'s considerable PDV related expenditure.

[73] N.P. stands for 'not for publication', due to confidentiality reasons (Screen Australia, 2013d, p. 6).
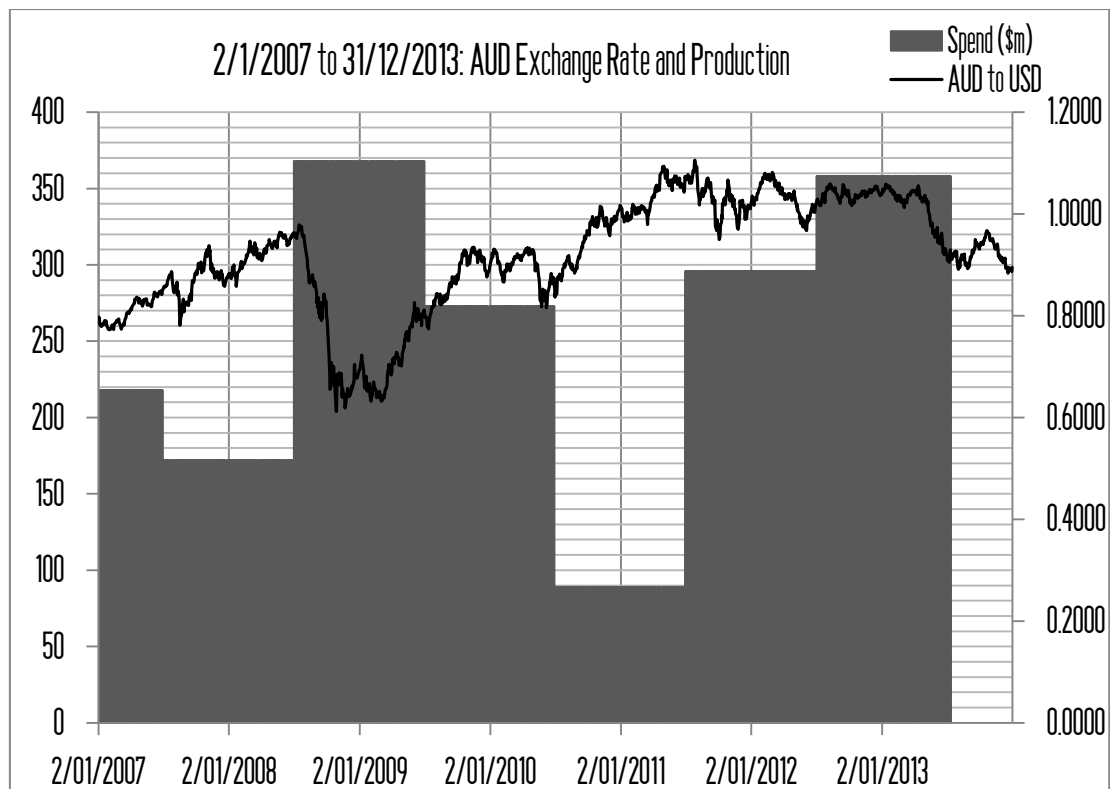
3.22: 2/1/2007 to 31/12/2013: A comparison between the AUD exchange rate and film production spend (Screen Australia, 2012a; 2013d; RBA, 2014).

The *Gatsby* D3D production, and its approximate US$190 million budget, was therefore critical in achieving productivity stability as well as considerable foreign financial investment and global integration in the Australian industry (Bodey, 2013; Jericho, 2013; Raschella & Taylor, 2013). [74] These benefits are illustrated by the production's positive economic multiplier effect. A multiplier effect is when external money is paid to local businesses, such as production houses or contracted professionals, who then save a portion of this income and also go on to spend it by employing more local skilled staff or buying local goods, such as new camera systems, props or costumes. This process is then replicated with external money being passed on to other local businesses that also save a percentage and spend. Consequently, the initial, external spend stimulates extra spending within the industry and, to an extent, the larger economy: the bigger the external spend, such as a US$190 million spend, corresponds to a larger multiplier effect for the industry.

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[74] The AUD exchange rate on the first day of principal photography, according to RBA figures, was US$1.0588. This meant the US$190 million budget figure dropped by approximately US$11 million once the production's currency was converted. The impact on the local economy is reduced as a result of foreign workers, such as a number of the leading cast.

The scope of *Gatsby*'s spend means that its multiplier effect is difficult to quantify, particularly when considering issues such as the ratio of local and foreign expenditure and the production's interaction with other industries.[75] Nevertheless, by using the *Multipliers for culture-related industries* report's gross value added multiplier figure of 1.80 an estimate can be made (CMC, 2011). As one might expect, the estimate for *Gatsby*, which totals US$189 million, is very close to the estimated gross production budget total of US$190 million. The multiplier figure therefore suggests that by enticing the *Gatsby* production to Australia, the Federal Government and Screen Australia essentially had the PO incentive investment paid-off simply by having the production go ahead. The financial incentive used to increase productivity was returned in addition to the production's net budget expenditure (approximately US$105 million), which is essentially the PO's capital return. In other words, the feedback loop was successful and Australia's first blockbuster D3D production returned the funding investment.

CHAPTER CONCLUSION

D3D production and funding policies, such as the ASPI, have a mutually beneficial relationship. Financial incentives have clearly driven the expansion of D3D production into national cinema industries that had not participated in its production prior to the digital screen period. This expansion is despite the fact that D3D did not have a role in creating and developing financial film production incentives. However, D3D filmmakers have co-opted funding policy. This has had significant ramifications for the adoption of D3D screen technology and the development of various approaches to D3D technique and visual style. In return, D3D production provides a national cinema with a means

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[75] According to Knapman, the production had 'an enormous crew' and was 'in excess of a thousand people'. Knapman also says that the film had a 'background cast of 960', and 'close to 300 extras on set on the "party days"' (Warner Bros., 2013, p. 19). An early press release from the NSW state government stated that:

> *The Great Gatsby* ... will invest $120 million in NSW. An estimated 275 crew will be employed during pre-production. More than 400 cast and crew will be employed during principal photography, as well as many extras. An estimated 150 post production and visual effects crew will also be employed (NSW Government, 2011).

of integrating itself into mainstream cinema's global market with significant returns that stabilise and, potentially, grow the industry. Integration is achieved while maintaining a cultural, industrial as well as commercial return on funding investment. This relationship is a part of what that makes D3D significant in the digital screen period.

Baz Luhrmann's D3D film, *The Great Gatsby*, is an example that broadly illustrates the ways that mainstream production has changed as a result of this relationship. Moreover, it is a particular example of the ways that Australia's funding policy specifically relates to and has an influence on D3D production. It shows, for instance, how the incentive motivated particular elements of the production, not least a different studio, a move in location away from the USA to Australia, as well as the use of local companies and crew employment. It also demonstrates that the financial outlay of the incentive is offset by the capital raised from the increase in productivity. The ASPI succeeded in helping to bring the production to Australia at relatively no expense overall. Nevertheless there is tension between culture and commerce in the example. Initially *Gatsby* was contested as being un-Australian. The analysis of the production shows that it complies with many of the SAC test guidelines and its broad definition of Australian content. The film even suits the direction of the film industry towards 'better business and bigger audiences' (Harley, 2009, p. 4). In satisfying this definition, *Gatsby* is an instance of the uptake of stereoscopy in a different national film industry context: by Australian filmmakers in the Australian film industry.

In terms of the thesis argument, *Gatsby* illustrates particular ideas about D3D in relation to different national industry participation and different approaches to D3D. This approach refers to a blockbuster screen adaptation that combines an *auteur*'s montage-based visual style with an author's literary style; technical innovations, including positioning the primary object close to the camera lens in order to achieve a sense of immediacy; and narrative development, as in re-framing Nick's retelling of the *Gatsby* story. In the context of the thesis argument, the examples of Australia's participation in D3D production provides a significant perspective on the relationship between

technology, technique and visual style and D3D's significance in the digital screen period as a part of broader industrial shifts. The next chapter contributes to the theme of D3D expansion by discussing how different modes of production, namely long-form documentary productions, have assimilated D3D. It also illustrates, via Australian documentary examples, how D3D's visual style is being taken up in other film contexts by Australian filmmakers.

CHAPTER FOUR

CONNECTED DOCUMENTARY SPACES: *CANE TOADS: THE CONQUEST* AND *STORM SURFERS 3D*

INTRODUCTION

D3D's expansion into different national industries has coincided with an expansion into other genres and other modes of production. Documentary, a broad genre of cinema with its own modes of production, is an important part of this expansion. It has grown to include D3D feature film examples, such as *Cane Toads: The Conquest* (2010), *Pina* (2011), and *Cave of Forgotten Dreams* (2011); event film examples, such as *The Official 3D 2010 FIFA World Cup Film* (2010) and *Justin Bieber: Never Say Never* (2011); as well as IMAX's 40 minute long nature- and history-based films, which have dominated stereoscopic documentary production since the 1980s boom period. This expansion is significant for a number of reasons, in particular because D3D, and its varied uses, represents another approach to the 'creative treatment of actuality' (Grierson, 1966, p. 147). It helps to explain the relationship between D3D technology and visual techniques and visual styles. That is, filmmakers in diverse national industry contexts, including Australia, have adopted D3D to provide an enhanced sense of reality through which they have explored different forms of documentary production.

In most cases the regularity of D3D use in cinematic feature documentary, event and IMAX sub-genres corresponds to particular modes of representation. Bill Nichols's six principal modes of documentary filmmaking offer a framework that can be extended to D3D in order to categorise its relationship to visual technique and visual style. Nichols's (2010) six modes are referred to as poetic, expository, observational, participatory, reflexive, and performative (pp. 31 – 32). These are defined in relation to their most prominent features. So, for instance, poetic is defined by its emphasis on 'visual associations, tonal or rhythmic qualities, descriptive passages, and formal

organisation' (p. 31), which characterise the filmmaker's expressive view. In contrast, the expository mode is defined by its emphasis on argumentative logic, which is typically enunciated by narration laid over visuals. In the expository mode, a case is stated, plotted, and supported with information in an attempt to persuade an audience. In the observational mode, emphasis is placed on 'a direct engagement with the everyday life of subjects as observed by an unobtrusive camera' (p. 31). Life is observed, with the audience witnessing the events and actions of subjects without the filmmaker presenting a subjective point of view or a persuasive argument. In the participatory mode, an interview or conversation between the filmmaker and subject is included (p. 31). The reflexive mode 'calls attention to the assumptions and conventions that govern documentary filmmaking' (p. 31). In this way, the reflexive mode questions characteristics of the genre, the various modes and their representation of subjects. In the last mode, performative, the relationship between filmmaker and subject is emphasised, with the filmmaker positioning himself or herself in the film in order to discuss, debate and develop ideas and the issues about a subject (p. 32). Unlike the participatory mode, the performative mode 'emphasises the subjective or expressive aspect of the filmmaker's own involvement with a subject' (p. 32). It favours the filmmaker's reaction to the subject. Each of these modes appears in relation to the main D3D documentary sub-genres.

However, some modes are represented in the sub-genres more than others. They are shaped in different ways, too. For instance, IMAX films generally reflect observational and expository modes. These modes, as well as the use of D3D, are shaped by the IMAX Corporation's vertically integrated business model and its contracted group of filmmakers, which provides a particular example of D3D technology, business and aesthetic production. Event films similarly reflect the observational mode; however, these films often do so within a broad media context of cultural celebrity profiling. The films provide a forum for subjects, typically music stars, to document the work to put on a specific performance or how they became famous. Cinematic feature documentaries, a broader categorisation than either IMAX or event sub-genres, often incorporate a mix of modes in order to present a subject. These films are

generally independent with pre-sale agreements with cinema and television exhibition, and have an online presence. They are also shaped by factors, most to do with limitations imposed on the film by the subject. In general, the application of D3D and use of a particular mode or modes of representation are shaped by significant business, social, and commercial factors, as well as attempts to creatively explore actuality.

In D3D documentary, as in the broad documentary genre, the creative treatment of actuality materialises in different ways. That is, the representation of actuality is balanced by the artistic means that signify in diverse ways and have effects on what is represented as 'real'. In some, a form of naturalism is constructed, where the sounds and images of the historical world are captured by the filmmakers with as little intervention as possible. In others, the 'real' is represented more conspicuously, as a 'best' version of 'reality', with sounds and images enhanced by technologies, visual techniques and visual styles. Often filmmaking devices are taken up that are similarly used in fictional films. The documentaries have treatments; stage, rehearse and perform action; have plotted and structured narratives that often lead to a climax; include exposition, commentary, and observation; have characterisation; and some also play with subjective and objective points of view (Nichols, 2010, p. ix). In D3D, they also incorporate a combination of monoscopic depth cues, floating particles, and a predominantly positive parallax depth which is regularly punctuated for effect with moments of negative parallax. These devices blur the distinction between documentary and fiction; but unlike fictional films, which the references to Murray, Sobchack, Woodcock, and Ross in Chapter One were related to (see 'Diverse Digital Affordances'), these devices are used in accordance with the attempts to explore actuality.

In this context, questions about the particular use of D3D arise: 'Why was D3D taken up in the production?' 'How was it taken up and how does it relate to the mode or sub-genre?' 'What relationship does D3D have to other visual techniques and visual styles?' Moreover, 'Does it reflect a particular period or movement of documentary production?'

MERGING SPACE: ACTIVE AUDIENCES

In each of the documentary modes and sub-genres, D3D's adoption and integration has had distinct ramifications for the relationship between the 'real', the image and the audience's relationship to each. For filmmakers, D3D represents a way to engage the audience, specifically to reconfigure their embodied position in relation to the objects and people on screen (Ross, 2011). This reconfiguration aims to achieve a physiological experience that is based on a connected film-and-cinema space. In these instances, the audience is positioned in a first-person or subjective third-person point of view. The idea is that these points of view ask the audience to explore the space, the subject and, in some cases, the argument. This positioning helps the audience to experience something that they would never get to experience in their normal lives, which is a key point of difference for D3D documentaries, particularly those in the event and IMAX sub-genres. The combination of D3D and documentary realism has led to an experiential aesthetic.

This aesthetic is different from other subjective perspectives in documentary. It is different, for instance, to first-person singular, such as Michael Moore's *Fahrenheit 9/11* (2004) or Morgan Spurlock's *Super Size Me* (2004), where a performative mode guides the audience along with the filmmaker while they present their subjective experience of the subject. It is also different to first-person plural, to diasporic subjectivity, and to virtual subjectivity, which all emphasise the filmmaker's perspective over the audience's reception of the image (Lebow ed., 2012, pp. 7 – 9). In D3D, this subjective experience relates to the subject, but also to the audience's relationship to the context in which the subject is being presented. This type of 'active experience' heightens particular aspects of the relationship between the filmmaker's argument and the audience's reception of this argument.[76] In short,

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[76] First-person cinema is, of course, not a new phenomenon. Alfred Hitchcock and Roman Polanski both utilised its effect to heighten the intensity of their respective thrillers, such as *Rear Window* (1954) and *Rosemary's Baby* (1968). Robert Montgomery's *Lady in the Lake* (1947) and Alexander Sokurov's *Russian Ark* (2002) base their entire aesthetic around a first-person perspective, while contemporary films, such as *The Blair Witch Project* (1999), *Paranormal Activity* (2007), *Cloverfield* (2008), *End of Watch* (2012) and *Chronicle* (2012), tie a first-person perspective to a narrative device that centres upon footage that is either found or

the visual style continues to represent a filmmaker's or documentarist's voice, but it also includes the audience in a much more noticeable way (see figure 4.1).
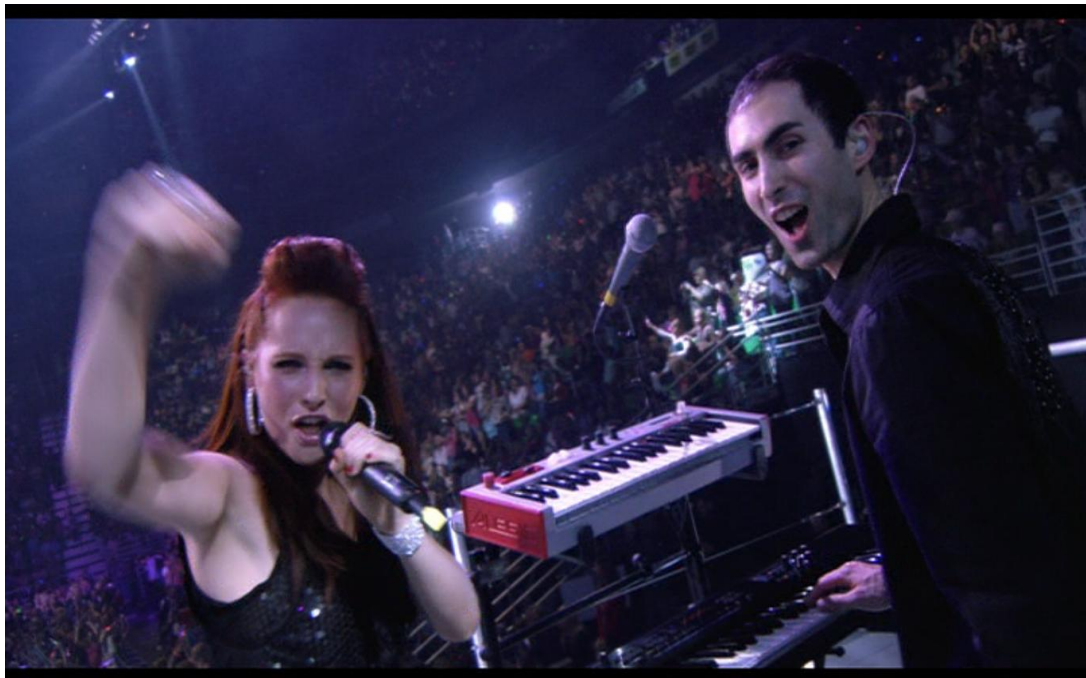
4.1. *Hannah Montana & Miley Cyrus: Best of Both Worlds*: Performers acknowledging the non-diegetic audience and inviting them to join/experience the fun.

This active experience aesthetic correlates with the oft-cited idea relating to fictional genres and audience response, which likens the cinema screen to a plate-glass window (Bordwell et al., 1985, p. 59; Marks, 2000, p. 162; Sobchack, 2004b, p. 4). That is, in conventional cinema the audience perceives space via a combination of classical continuity devices and psychological projection. Bordwell et al. (1985), for example, argue in regard to classical continuity cinema that the Hollywood mode of production 'makes the screen a plate-glass window':

> partly because it turns a remarkably coherent spatial
> system into the vehicle of narrative causality; but it is also
> because the viewer, having learned distinct perceptual and
> cognitive activities, meets the film halfway and completes
> the illusion of seeing an integral fictional space (p. 59).

is in the process of being filmed. In regard to Australian documentary, films, such as *Least Said, Soonest Mended* (1999), offer a first-person point of view, which is often defined by narration, observation, 'reality' staging scenarios, and so on (FitzSimons et al., 2011).

The same basic premise is true in D3D documentary, albeit with a greater amount of depth information at any one time which works to distinguish the effect. In short, the active mode is an extension of the plate-glass window mode, and engages the audience in much more clearly defined ways, as in moments of direct address (see figure 4.1 and 4.6) or touch (see figures 4.3 and 4.10).

The amount of depth information in D3D is significant. It expands the notion of the plate-glass window and shifts the goal of production from the creation of a continuous three-dimensional space, as in classical continuity cinema, to the creation of a connected space. So, rather than merely provoking the audience to complete the construction of space, which has already been achieved by the stereoscopic system's right- and left-eye images and the use of monoscopic devices, D3D has the potential to change the way the audience interacts with the film. In D3D, the plate-glass window is potentially removed altogether to leave an unobstructed pathway for the film objects to transverse into the theatre space and the audience to project into the screen-space: both spaces merge into one, continuous space.

4.2: *Pina*: Positioning the immersed cinema audience in a spectator role.

Miriam Ross's (2011; 2015) analysis in *Spectacular Dimensions: 3D Dance Films* regarding the D3D documentary, *Pina* (see figure 4.2), as well as

the dramatic feature films, *Streetdance 3D* (2010) and *Step Up 3D* (2010), reflects on the notion of a connected space. Ross argues that the D3D often makes it appear as though the dancers are positioned within the cinema. This positioning re-contextualises the cinema audience's position in relation to the dancers; which is to say that by selectively using negative-parallax images, the filmmakers, in this case Wim Wenders and crew, have brought the audience 'to within touching distance of the characters' bodies' (para. 6). This effect, says Ross, 'is made all the more potent when the dancers' continued motion articulates the space between the dancers and the audience' (para. 6). The movement acts in much the same way as moving particles, so that the visual planes merge together to make a viscous, connected space (Kehr, 2010, p. 67). This connection is made all the more compelling by a form of direct address (Ross, 2011, para. 7; 2015, pp. 61 – 68 & 149 – 172). The direct address breaks the fourth wall of the cinema experience, and in doing so defines a form of visual conversation between film and audience. The audiences' gaze is received and returned by the film's characters. These instances typically occur in relation to first-person perspectives so that there is a form of represented embodiment, a filmic avatar, in the filmed space. Ross says *Pina* uses this direct address in a number of instances. An example is the film's first piece, *The Rite of Spring*, where a dancer stares directly into the camera and directly at the cinema audience.

In the *Spring* example, a male hand emerges from the bottom of frame, illustrating that the audience has been positioned as a male character looking directly at 'the chosen one' in the dance piece. It engages and imposes a point of view onto the audience, notionally making them participant, dancer, in the filmed situation. For Ross (2011), this connection between film and audience means that:

> On the one hand, [the D3D aesthetic] represents a new
> form of realism in which the stereoscopy brings the
> spectator towards the action and into the *mise-en-scène* in
> a way that treats the viewer as a character in the narrative.
> The envelopment of the viewer in the 3D screen space
> allows their constituent place in the screen action to
> replicate their spatial placement in real world action. On

> the other hand, the film acknowledges a viewer in the
> auditorium who is outside the diegesis (para. 11).

That is, the space of the film and the space of the cinema merge together to change the way that the audience reacts to the film; it makes it possible for the audience to be a spectator of the events and also a player in the events, as illustrated in figures 4.2 and 4.3. In both cases, the presentation of each image is designed to relate to the audience's perspective. It exaggerates the production's ability to connect the film to the audience, and provide an experiential form of production.

4.3: *Pina*: Direct address.

1. EVENT FILMS: 'Just like being there'

The idea of a combined space has particular currency in the event film sub-genre, sometimes referred to as 'the event-centred film' (Rabiger, 1998, p. 336). As the name suggests, these are films that primarily focus on an event, often a music concert or a sports match, where the logistics of the event are determined independently of the film. As well as the event itself, event films are informed by and typically seek to document the logistics of the event (Rabiger, 1998, p. 336). They commonly include location shooting; multiple, often mobile, cameras; high key lighting; and a mixture of short and long focal lengths. D3D event film

examples are *U2 3D*, *Hannah Montana & Miley Cyrus: Best of Both Worlds*, *Justin Bieber: Never Say Never*, *Metallica: Through the Never* and (see figure 4.4).

Film	Year	ASL	Director/s
Hannah Montana & Miley Cyrus: Best of Both Worlds	2008	4.23	Bruce Hendricks
Jonas Brothers: The 3D Concert Experience	2009	3.79	Bruce Hendricks
The Official 3D 2010 FIFA World Cup Film	2010	4.2	Johnson Mckelvey
Glee: The Concert Movie	2011	2.51	Kevin Tancharoen & Jennifer Arnold
Justin Bieber: Never Say Never	2011	3.34	Jon Chu
Katy Perry: Part Of Me	2012	2.92	Dan Cutforth & Jane Lipsitz
One Direction: This Is Us	2013	2.33	Morgan Spurlock
Metallica: Through the Never	2013	3.56	Nimród Antal

4.4. ASL of D3D event films.

Space plays an important role in the sub-genre. It defines much of the action. A sporting event, such as a football match, for instance, is framed by particular spatial characteristics, such as a stadium and a field with a goal at either end. The lines on the field denote various characteristics of a film's action. The closer the play is to the goal line, for example, the greater the intensity and suspense of the action. Significantly, this action is contextualised along x, y and z axes. The ball is kicked across the field, up in the air, and into and away from camera positions. Similar spatial characteristics are included in concert performances, although in most instances the y-axis is less of a factor.

In order to illustrate space, films take up specific elements of technique and visual style. In a football match, the dominant, establishing camera is positioned in the stadium stand to imitate a typical spectator's position (Buscombe, 1975, p. 32). The camera's position also works to orient the action along a horizontal plane (Buscombe, 1975, pp. 31 – 32). This plane helps to illustrate the relative positions of the ball and players to either goal, leading to peaks of excitement when a goal is scored. The idea is to connect the cinema audience, notionally positioned in the stands, to the event's space and to its

action. In D3D, the idea is extended so that they offer a D3D aesthetic similar to that described by Ross; in fact, Wim Wenders even cites the event film, *U2 3D*, as being a key influence on his use of D3D during *Pina*'s production. According to the *auteur* director:

> Pina [Bausch] and I looked at the works of hers that had been recorded already. I couldn't help noticing that she wasn't happy with them … I had to tell her honestly that I didn't know how to do it much better … I felt that I was in front of an invisible wall I could not cross … The revelation finally did not come from anything I made up conceptually, but from technology – from a place I had expected it least. When I saw the first [live-action] 3D film, *U2 3D* – the precursor of the new craze – I realised that was the answer! I'd never thought of 3D as a solution in all these years, but there it was. With this technology one could do justice to dance – one could enter the very realm of the dancers: space … In 3D there is this other dimension: the film is *inside* the dancers' very own realm (James, 2011, pp. 22 – 23).

This is to say Wenders felt that he was inside the band's realm when watching *U2 3D* and then attempted to replicate this aesthetic for *Pina*. Like *Pina*, *U2 3D* and other event films use musicians, and their movements in relation to equipment, to the crowd, to a stadium structure and, in some cases, via computer generated imagery (as in figure 4.5), to define the viscous space. This information has the potential to connect the cinema audience to the screen-space. In creating this aesthetic, the film provides a unique perspective of the event. The audience is positioned to connect with event in a seat in the cinema theatre, while also getting access to the more intimate on-stage and backstage locations, as a VIP ticket holder. This connection is reiterated by moments of direct address, as illustrated in figure 4.6.

4.5: *Justin Bieber: Never Say Never*. Floating screen shots of fans performing the artist's song illustrate the size (particularly along the z-axis) of the Madison Square Garden arena.

4.6 *Hannah Montana & Miley Cyrus: Best of Both Worlds*. Breaking the fourth wall.

In general, the use of stereoscopy in event film sub-category of documentary is specific to the digital screen period. This innovation has evolved out of conventional event productions which have always attempted to conflate the cinema experience, or home-theatre experience, with the concert experience so that the cinema experience is just like being at the concert or sporting event, but with the added value of greater access. The marketing of each film typically

centres on this experiential theme. *U2 3D*'s marketing strategy, for example, reflects on the cinema audience's proximity to the stars by saying that, 'You too can see … hear … feel … experience … know Bono, Edge, Adam Clayton and Larry Mullen Jr.' (Owens, Pellington, Shapiro, Shapiro & Modell, 2008). For *Glee: The Concert Movie*, the marketing exclaims, 'Enjoy front-row seats to the sold-out concert of the year!' (Tancharoen, Arnold, Murphy & Di Loreto, 2011). The cinema ticket-holder gets a comparable concert experience and more: an enhanced concert experience. The audience gets to 'know' the band as well as gain access to a sold out, popular event.

In this context, the event film offers advantages to both consumer and performer. Consumers get a chance to watch their favourite performers in a setting that essentially emulates the concert in terms of a congregation of 'similarly-minded people' (Honess Roe, 2012), a fact that also emphasises their role in defining the reception of the content as they would at the actual performance. Performers, in particular mainstream popular performers, have a chance to increase their exposure and their consumer reach. Each group's physical location is no longer as much of a limitation to their goals, whether that goal is to become more acquainted with celebrity or achieve more exposure with a consumer group. This characteristic of event films corresponds with other content, such as albums, music videos, twitter feeds, websites, fan sites, television appearances, merchandise, and so on, which define and shape a performer's image. It builds the performer's world, imbuing it with greater detail about their life and their work.

The broad characteristics of these films include a substantial documentary budget, typically totalling over US$10 million;[77] the use of multiple cameras and post-production effects; a biographical narrative or narrative that is thematically connected to the performer's music; and a trend towards an intensified continuity and D3D style. In most cases, overt negative-parallax images provide moments of the spectacular, with drum sticks poking

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[77] *U2 3D* was budgeted at US$15 million; *Justin Bieber: Never Say Never* was budgeted at US$13 million; *Katy Perry: Part Of Me* was budgeted at US$12 million, and *Metallica Through the Never* was budgeted at US$18 million. In contrast, the IMAX films, *Sea Rex 3D* and *Wild Ocean*, were both budgeted at around US$5 million.

into the theatre space (see figure 4.6), guitar plectrums thrown at the audience or, in the case of *Jonas Brothers*, drums splashing water out of the screen and into (or rather onto) the audience space (see figure 4.7).

4.7: *Jonas Brothers: The 3D Concert Experience*. Water on the drum kit provides an instance of moving particles in negative-parallax.

Glee: The Concert Movie, Katy Perry: Part of Me and *Justin Bieber: Never Say Never*, and others, also use a mixture of post-converted and natural D3D. In these instances, archival or observational footage, which typically includes unpolished or amateur-handheld shots with fewer cuts, available lighting (with high gain levels) and, in some examples, automatic zoom and focus, is post-converted. In contrast, the natural D3D concert footage is relatively glossy with smooth technocrane camera movements, synchronised effects and production lighting, and rhythm-based cutting. The division between converted and natural is emphasised in films, such as *Glee* and *Katy Perry*, which have two distinct parts, with two different directors for each part. In *Glee*, for example, Kevin Tancharoen was contracted to direct the concert sequences shot in natural D3D while Jennifer Arnold directed the observational, behind the scenes and fan documentary sequences, which were shot conventionally before being converted into D3D.

The archival or observational footage sections in these examples function to justify the artist, the film and concert with essential myth making information. In *One Direction: This Is Us*, the archival elements focus on the key narrative events that led to the band's current form. The film includes the band's formative period as an act performing on the *X-Factor* program in the UK, their connection to Simon Cowell and his label, Syco Records, and their subsequent global popularity. Observational material relates to the five band members as middle-class boys that have achieved success, with one member even returning to the bakery he worked at before joining the band. Similar forms of observed daily routine are found in *Justin Bieber: Never Say Never* and *Katy Perry: Part of Me*, both of which detail the performer's respective rise to global stardom from humble beginnings as, in the case of Bieber, a child growing up in Stratford, Canada, or, in the case of Perry, as a child of Pentecostal pastors travelling and singing gospel songs in the USA. For other examples, such as *Jonas Brothers: The 3D Concert Experience*, archival elements are dropped in order to focus on the routine of a performer leading up to the filmed concert. Otherwise it documents the artistic and industrial processes through which a particular concert performance was prepared, such as *Hannah Montana & Miley Cyrus: Best of Both Worlds*. They function as profiles of celebrity.

However, not all event films profile the subject in this way. *Metallica Through the Never* foregoes the typical observational scenes and instead uses a fictional narrative to intersect and correspond to the themes of the concert and music. These narrative scenes reflect the D3D narrative form. The stage performance includes a range of visual devices that correspond to the film's documentation of the venue's space, such as multiple large screens, on-stage props, and laser lighting. In these sequences, the audience is positioned within the stadium, either in the seated or standing area, or on stage with the band. Cutting away from the performance, the narrative begins. Its protagonist, Trip, a stagehand working at the concert venue, is seen taking a red and blue tablet that provokes a series of disturbing hallucinations. These events coincide with the band's lyrics and stage show: a thematic extension of the music akin to a tradition music video. These hallucinations occur at a point in the concert when

the band begin to perform the song, 'One', about a soldier who suffers from a form of locked-in syndrome. This juxtaposition effectively ties the song to the film's transition into an alternate reality. The subsequent narrative follows him as he becomes involved in a riot between a group of young adults, riot police and a strange masked horseman. The events of the alternate reality continue until Trip finally re-surfaces back at the concert venue with the band – which similarly denotes the character's arrival back at the film's actual reality . The band performs one last song to an empty stadium venue, reiterating the enhanced concert experience offered to cinema-goers.[78]

Never's narrative scenes use a third-person limited perspective where the audience follows Trip and ultimately empathises with his personal struggles to find the van, to experience the riot and to escape the masked horseman. These scenes function in much the same way as dramatic feature films, such as *Avatar* or *Tron: Legacy*. In terms of the concert, though, the film reverts to observational mode, where the spatial environment of the performance is intended to merge with the audience's space. In effect, it denotes a blurring of fiction and documentary.

In general, event films take up D3D to illustrate the spatial characteristics of performance more clearly. Some include overt profiling, which acts to shape the perception of the film's subject. The profiling also suggests a 'doing' action in regard to consumption of the subject's products. Other films integrate fictional narrative forms, which suggest an attempt to expand the documentary genre beyond traditional boundaries. In each case, D3D in event films is taken up to provoke an experience that brings the audience closer to the subject.

2. IMAX FILMS

IMAX's 40-minute-long D3D documentary films aim to achieve a similar experience. Any narrative scenes, however, are largely eschewed in order to focus upon the spatial environments of coral reefs, space, pre-historic plains and mountains, and so on, in a largely expository mode of representation. This

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[78] The film does not reveal what is inside the bag.

mode is as much a result of the technical and technological characteristics of IMAX production as it is a reflection on an intention to design a first-person experience. The large IMAX screen plays a key role. In particular, it provides large disparity values for right- and left-eye images that suit spatial design. As well, there are other contributing factors, such as the stereoscopic camera, the Solido, which has a fixed interaxial of 2.85 inches (7cm) with fixed lenses and a weight of more than 100 kilograms when loaded with two reels of 15-perf 65mm film emulsion.[79] These features mean that the camera is difficult to move and adjust, and expensive to operate. According to stereographer, Robert Morton (2014), 'You basically need four people to lift [the Solido] to move it anywhere, so handheld is out of the question'. In terms of visual style, the consequence of these factors is that IMAX films are typically made up of wide or long shots that include a lot of information, have relatively stable lens lengths, and have longer shot rates (see figure 4.8). In figure 4.8, for instance, the ASLs of 13 digital screen period IMAX films are listed. These films have a mean ASL of 10.6 seconds per shot, which is a significant increase on the event films listed in figure 4.4 (3.36 seconds per shot) and larger than the cinematic feature documentary films listed below in figure 4.11 (9.72 seconds per shot). The standard deviation of the selected IMAX films is 3.34 seconds, a result that, in comparison to cinematic feature documentary, represents relative ASL consistency. In short, the format's logistical limitations have become an IMAX-house aesthetic.

Film	Year	ASL	Director/s
Space Station 3D	2002	16.4	Toni Myers
Ocean Wonderland 3D	2003	14.6	Jean-Jacques Mantello
NASCAR 3D: The IMAX Experience	2004	5.8	Simon Wincer
Aliens of the Deep	2005	6.7	James Cameron & Steve Quale
Sharks 3D	2005	8.5	Jean-Jacques Mantello
Dinosaurs: Giants of Patagonia	2007	12.5	Marc Fafard

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[79] The Solido is a film emulsion camera. Films shot on the Solido, such as *NASCAR 3D: The IMAX Experience*, are still categorised as digital screen period productions because they were produced, distributed and exhibited within the digital screen period time frame.

Dinosaurs Alive!	2007	10.4	David Clark & Bayley Silleck
Grand Canyon Adventure: River at Risk	2008	14.3	Greg MacGillivray
Wild Ocean	2008	6.3	Luke Cresswell & Steve McNicholas
Dolphins & Whales 3D: Tribes of the Ocean	2008	11.7	Jean-Jacques Mantello
Sea Rex 3D: Journey to a Prehistoric World	2010	8.9	Ronan Chapalain & Pascal Vuong
The Ultimate Wave Tahiti 3D	2010	10.4	Stephen Low
Flying Monsters 3D	2011	11.7	Matthew Dyas

4.8. ASL of D3D IMAX films.

In addition to logistical characteristics, the IMAX aesthetic is actively maintained by the IMAX Corporation as a part of their identity and as a point of difference to competitors. The Corporation achieves this via the choice of filmmakers and the types of production companies and individual productions to partner with and finance. Anecdotes told by *Cane Toads* director, Mark Lewis, and *Storm Surfers 3D* co-director, Chris Nelius (2014), suggest that the criterion is particularly rigid, with Nelius stating that 'IMAX are quite sticklers for the format, so if you want to show it in IMAX you'd have to shoot it in IMAX'. So, as well as the format's logistical limitations shaping the IMAX aesthetic, this aesthetic reflects a particular mode of production which fits into the Corporation's vertical integration business model.

One example of these factors combining together is *Sharks 3D*, a film directed by Jean-Jacques Mantello. *Sharks*, presented within the context of a Cousteau-like underwater tour, has an ecological message concerning the impact of fishing on various underwater ecosystems. [80] This story, and IMAX's visual style, recalls the Corporation's historical connection to theme-parks, fairgrounds, museums and exhibitions where spectacle, education and immersion are key elements of the experience as well as key points of difference. The production attempts to provide a sense of immediacy. The large screen, dark theatre environment and use of D3D offer, as Janet Murray (1997) has argued in relation to earlier IMAX stereoscopic productions, an increased level of information as well as a more engaging visual: 'It is not merely a larger image

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[80] Indeed, the film is narrated by Jacques Cousteau's son, Jean Michel Cousteau.

but a more present reality' (p. 45). The images reach beyond the audiences' peripheral vision to submerge them in the filmed environment, an effect aided by the swimming wildlife and floating debris that provides natural depth cues.

4.9: *Space Station 3D*: A linear perspective shot, filmed by astronauts on-board the ISS.

Another example of IMAX is the film, *Space Station 3D*, directed by Toni Myers. It details the construction of the International Space Station (ISS) by small teams of cosmonauts and astronauts (see figure 4.9). The film includes three launches, two from Kazakhstan, Russia, and another from Florida, USA. It also includes sequences of virtual reality training, space walks and equipment installation. In a similar way to *Sharks*, *Space Station*'s use of the format attempts to provide an overall sense of what life is like in a space shuttle, on-board the ISS and in space. This experience is 'just like being there', which is similar to the event film sub-genre. According to the narration, the film is 'as close to the ISS and space as the audience is likely to experience'. The film begins by using a series of first-person visual perspectives to position the audience in contact with the station (see figure 4.10). In the course of this opening sequence it becomes clear that these first-person images are taken from a virtual reality training program; nevertheless they work to orient the film in this subjective perspective. The approach is iterated in IMAX's characteristic tour guide form and in the film's direct verbal address to the viewer, 'If you'll

come along with me we will go behind the scenes and find out how these extraordinary people do [build the ISS]'. The offer to go behind the scenes is another characteristic that the sub-genre shares with event films.
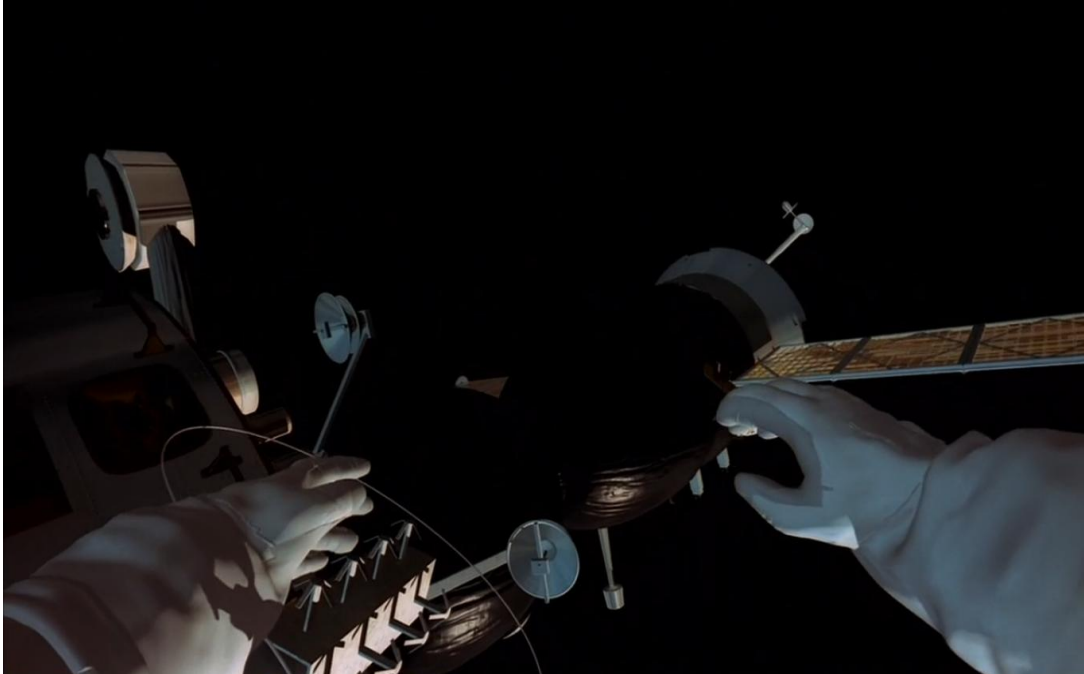
4.10: *Space Station 3D*. A first-person visual perspective.

In IMAX films, just as there are notable commonalities, there are also variations. These exceptions are to do with *auteur* productions that cross over between documentary and fictional genres. In *Aliens of the Deep* and *Wild Ocean*, for example, the filmmakers adhere to many of the core characteristics of the IMAX style but use noticeably lower ASLs than the other selected films. This is partially explained by the fact that each film was directed by a filmmaker who has a background in dramatic features and theatre production rather than IMAX documentary. Many *auteur* filmmakers, notably James Cameron, have integrated D3D into their respective documentary productions.

NASCAR 3D, *Aliens of the Deep* and *Wild Ocean* are unique films within the IMAX D3D sub-genre. *NASCAR 3D* is directed by Australian director, Simon Wincer, who had previously directed dramatic feature films, including *The Lighthorsemen* (1987), *Quigley Down Under* (1990), and *Crocodile Dundee in Los Angeles* (2001). It begins with a dramatised retelling of the early history of NASCAR, including a police chase which morphs through decades of racing,

from a stockcar race to a contemporary NASCAR race. *Aliens of the Deep* is co-directed by James Cameron, four years before the release of *Avatar*, and Steven Quale, six years before *Final Destination 5*, both dramatic D3D feature films. *Wild Ocean* is co-directed by Luke Cresswell and Steve McNicholas, the key creative figures in the theatre production, *Stomp*. In these instances, the IMAX-house aesthetic is shaped in different ways. One noticeable difference in approach to visual style between these three and other IMAX D3D films is to do with ASL. *NASCAR 3D*, for example, has an ASL (5.8 seconds per shot), which is around 5 seconds lower than the mean ASL for IMAX films (see figure 4.8). For *Aliens of the Deep* and *Wild Ocean*, the ASL figures are around four seconds lower.

Even so, variation is generally limited. All the IMAX D3D films share an emphasis on experiential and expository education via a D3D high-resolution large screen exhibition. As well, they document subjects that audiences are unlikely to ever experience in person. That is, they offer the audience a chance to experience a controlled altered state, even if the effects are momentary, be it of deep under the ocean or a prehistoric plain. In this way, IMAX films share many characteristics with event films, in particular by presenting a common subject-and-audience space.

3. CINEMATIC FEATURE DOCUMENTARY

A broad categorisation, cinematic feature documentaries are defined by several characteristics: their length, which is greater than the television hour; their varied approaches to subjects, including the technical and logistical limitations of subjects; different purposes; use of modes; and their diverse contexts for distribution, including theatrical, television, streaming and festival. Emblematic of the category's variability is the standard deviation of cutting rates (see figure 4.11). Taking in to account the five cinematic feature documentary films, the standard deviation is 7.7 seconds, with the shortest (*TT3D*) and longest (*Cave*) cutting rates separated by around 18 seconds (a differential that is longer than any event film, IMAX film ASL).

Film	Year	ASL	Director/s
Cane Toads: The Conquest	2010	4.22	Mark Lewis
Pina	2011	12.8	Wim Wenders
Cave of Forgotten Dreams	2011	21.81	Werner Herzog
TT3D Closer to the Edge	2011	4.06	Richard De Aragues
Storm Surfers: The Movie	2012	5.7	Justin McMillan & Christopher Nelius

4.11. ASL of D3D documentary feature films.

TT3D has the lowest ASL of the selected films at 4.06 seconds/shot, which is akin to the fictional feature film ASL range of three to four seconds per shot (a characteristic shared with various event films). This figure belies *TT*'s intensified continuity style, which is reflected by the fact that Richard De Aragüés' career includes directing commercials: the relatively short ASL of *TT3D* corresponds with his work on Samsung's 'Millimeters Matter' commercial (ASL of 2.3 seconds/shot); Danone's 'Rain' commercial (1.8 seconds/shot); and McDonald's 'Cheeseburger' commercial (ASL 1.8 seconds/shot). Typical of the intensified continuity style, *TT3D* also includes long cuts that punctuate the short ASL. These shots often appear in tandem with high-speed, first-person points of view (see figure 4.12). In particular, they highlight a connection between D3D and ride film aesthetic, one that illustrates the unity in the film's form and its content. As Abrams (2000) has argued more generally, these shots work on the basis that immersion is achieved by projecting velocity stimuli onto a screen – which is then gradually assimilated by the audience – in order to provoke a rush of speed. In *TT3D*, the film's various long first-person shots act to position the audience relative to the speeding motorcycle (or rather, on the motorcycle). The sense of high-speed is illustrated by a 'turned down' D3D style, so that a linear perspective composition of the road, the visual blur of passing houses, trees, grass, fences and road signs, and also the high-pitched engine soundtrack combine to provide the rush of speed. These longer cuts maintain the intensity of the scene. They provoke the audience, who have come to understand and make sense of the scene's velocity stimuli, into meeting the film halfway and complete its illusion. The overall result is that the motorcycle rider essentially becomes an avatar of the audience. The action spectacle context of

TT3D naturally corresponds to a combination of D3D, cutting, and camera movement (often handheld or attached to a vehicle) evokes the speed, intensity and, at times, disorientation of the racing activity. The visual style is subsequently carried into the participatory and observational documentary scenes, albeit modified to include a stationary camera.

4.12: *TT3D*: Riding the Isle of Man TT course.

In contrast to *TT3D*, Werner Herzog's *Cave of Forgotten Dreams* (see figure 4.13) and Wim Wenders's *Pina* have considerably longer ASL totals. These films continue a European art film tradition that combines an emphasis on staging with long shots.[81] They reflect a form of 'slow cinema' that the filmmakers, both recognised *auteurs* producing D3D for the first time, have defined over their respective careers. Wenders (2001), for example, explains the style as evolving out of an interest in simply watching an event take place, saying that it 'doesn't matter what it is, I just think it should keep faith with the passage of time – even when it's not a "realistic" film at all, but quite artificial' (pp. 161 – 163). In the context of debates surrounding D3D, Herzog's and Wenders' films relate to William Brown's notion of cutting in D3D. For Brown (2013), '[D3D] cinema is, like neorealist cinema, a cinema that rejects the cut and therefore which allows the dimension of time to come to the fore (whether

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[81] Herzog's *Woyzeck* [1979] and Wenders' *The Goalie's Anxiety at the Penalty Kick* [1972] are notable examples of films with long shots.

or not this aesthetic is applied to 'real' or 'computer generated' spaces)' (para. 9). This argument corresponds with the findings in Chapter Two concerning D3D cutting rates in popular films. In that instance, the majority of filmmakers typically approached the screen technology using medium to long length shots (three to four seconds per shot), a move that aligned D3D use with dramatic genre films rather than action films with rapid editing (two seconds or shorter per shot). In much the same way, the philosophy of European art cinema aligns withthe results of this earlier analysis, and draws a line between temporal and spatial components of popular and European art cinema.

Factors relating to subject also figure in the uptake of technique and visual style, in particular the cutting rates and shot size selection of each film. During *Cave*'s production, for example, Herzog and crew were limited to a short six day period of time to shoot in the Chauvet-Pont-D'Arc Cave. In addition, only four crew members were allowed in the cave at one time. This crew were required to dismantle their production equipment, carry it into the cave, and then rebuild the equipment in order to avoid damaging the cave walls (Pennington & Giardina, 2013, p. 165). They were also restricted to a metal walkway once they were inside the cave. These preconditions, imposed by the French Government, were due to the cave's high levels of CO_2 gas and 99 percent humidity, and the fragile state of the paintings and other historical artefacts, such as 32,000 year old footprints (Wigley, 2011, p. 28; Pennington & Giardina, 2013, p. 165). These preconditions mean the film is another instance of D3D documentary enabling the audience to experience something that they would not likely be able to in their normal lives. In terms of it shaping the film, Herzog says:

> You do not sense the CO_2 gas, but after an hour or so you feel woozy ... There are safety precautions, gas masks and oxygen tanks, all sorts of things. In another part of the cave there is a fairly high concentration of radon gas – this has a cumulative effect, so you don't stay too long (Wigley, 2011, p. 28).

The fact that the caves were a difficult and dangerous place to enter into resulted in limited coverage of the paintings. In relation, the variety of shots to

cut between was limited, leading to periods with limited cutting, while only a few paintings were filmed in close-up. So, as in event films, the logistics of the subject, in this case caves, shaped the way that the film was produced.

4.13: *Cave of Forgotten Dreams*. Paintings in the Chauvet-Pont-D'Arc Cave are described by Herzog as a 'proto-cinema'.

Cane Toads: The Conquest and *Storm Surfers 3D*, both Australian productions, include similar instances when logistics shaped production. These films are particular examples of D3D documentary and, more generally, digital screen period stereoscopy. They include, for instance, extreme environments, such as remote locations and severe weather conditions. They include elements of D3D ride film production and slow cinema, and an experiential aesthetic. As well, they attempt to position the audience in a place they have never been before, to connect the audience's space with the screen space, and include first-person perspectives.

Moreover, *The Conquest* and *Storm Surfers* correspond with a particular, but varied, national approach to D3D documentary which includes *auteur* and franchise production. That is, they both illustrate a range of cultural and industrial exchanges between Australia and other national cinemas, including international theatrical and television distribution. The two films represent a transition of previous work into D3D. *The Conquest*, for instance, shares many

characteristics with Mark Lewis's earlier Film Australia documentary production, *Cane Toads: An Unnatural History* (1988). It is an instance of a filmmaker applying and exploring D3D in the context of a remake. Meanwhile, *Storm Surfers* continues a long tradition of Australian surf documentaries, and includes the surf film's typical distribution model, namely four-walling. The film marks the transition to D3D of the *Surfers* franchise, which includes webisodes, digital games and conventional documentary productions.

These characteristics make these films unique to D3D and Australian documentary. To explore this point, a series of interviews were conducted with the filmmakers of each film: in terms of *Cane Toads: The Conquest*, this included director, Mark Lewis, and stereographer and cinematographer, Paul Nichola, while for *Storm Surfers 3D*, it included co-director, Chris Nelius, and stereographer, Robert Morton. These interviews reflect each film's investigative mode of production. Quotes from them support the analysis of the production process and film forms. They are practitioner accounts of D3D that explain the screen technology's adoption and integration in documentary production. They give insight into pre-production and funding; the development and creation of D3D production technologies; creative intentions and decisions; the way that narrative form and visual style function in relation to each other; and the pathways taken to distribute and exhibit the completed film.

Cane Toads: The Conquest

The Conquest, sometimes referred to as 'Ava-Toad', was the first stereoscopic feature film to be produced by Australia (Australian Broadcasting Corporation. 2010).[82] However, the film is the second version of the story. *The Conquest* updates and expands upon Lewis's 1988 film, *Cane Toads: An Unnatural History*. This first film is celebrated for Lewis's creative and comic treatment of a natural history subject. His style, which is also evident in *The Wonderful World of Dogs* (1990), *Rat* (1998), and *The Natural History of the Chicken* (2000), was undoubtedly a key consideration when the film's investment partners prompted the filmmaker to return to the subject of toads (Boltin,

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[82] An initial title for the film was *Cane Toads: The Devil Toad* (Albeck, 2008, p. 68).

2011). Part funded by Participant Media, Discovery Channel and Magnolia Pictures, *The Conquest* was also funded by Screen Australia. The film passed each of the key areas of the Significant Australian Content (SAC) test for a Producer Offset (PO), although in order to make the balance against the PO's 40 percent the production's finances needed to be toggled: crew wages were deferred and Lewis's Australian house was mortgaged (Lewis, 2014). Ultimately, the film was produced by Radio Pictures, an independent production company, run by Lewis in Australia with offices in the USA, and released in 2010 in conventional and D3D versions exhibited theatrically and on television.

The film's story begins by tracing the toad's arrival in Australia from Hawaii in 1935; its failure to control the greyback cane beetle; and its successful adaptation and survival in Australia's climate. This contextualisation of the toad gives way to the film's subsequent analysis of biological and cultural issues, such as the toad's mating habits and defence mechanisms; its social and cultural legacy in Australia; the various policies introduced to curb their rapid growth; and an analysis of the people that the toads live with and around. In much of the same way as *An Unnatural History*, what begins with a focus on an animal and its journey to Australia quickly shifts to become a sociological study of Australia and Australians, in particular a focus on the cultural reaction to the toad. The central conflict of the film is then articulated to be between, on one hand, the toad and, on the other, the human participants.

Illustrating the Conflict

To make the film and refine the D3D technology, Lewis enlisted stereographer and cinematographer, Paul Nichola, as well as post-production crews, namely VFX house and Cutting Edge (which were also a part of Baz Luhrmann's *The Great Gatsby*). Lewis and Nichola had previously worked on films during their respective diplomas at the Australian Film, Television and Radio School in the early 1980s. During this time, Nichola, a technically gifted filmmaker, became interested in the design and projection of holograms. This interest led him to stereoscopy and its relationship to macro photography. For Nichola (2014), the intention was as follows:

> To try and migrate the viewer into a viewing zone that they
> could not experience in normal life … It was one step
> beyond the idea of actually being there … It was the idea
> that you could be there in a way that you could not actually
> be. So, if I could actually bring you down to the point of
> view of an ant and put you into an ant's nest or a beehive as
> if you were the size of a bee then I've done more than
> actually taken you somewhere. I've taken you somewhere
> that you can't ever get to. I've given your brain information
> that your physical body can't ever take you to.

That is, his philosophy of stereoscopic production was to create new experiences for audiences, experiences that have since become a major part of D3D documentary, particularly in event and IMAX sub-genres, as well as in films, such as *Cave of Forgotten Dreams*. Nichola's background and his philosophy of stereoscopic production meant that he was a perfect choice to help Lewis on the production.

Nichola and crew had six weeks to get the production equipment ready. Nevertheless, the crew built monitoring systems (1280 x 720 OLED screens) and camera rigs. One of the main innovations was a custom adapted compact SI-2K camera rig, which included several notable design features. The rig was comprised of a camera that pointed directly at the subject and another that was pointed at a mirror. Unlike most converged rigs with mirrors, however, Nichola's rig was designed so that the SI-2K cameras did not toe-in for convergence. The benefit of a fixed design was that the rig became smaller so that it could be placed into positions low to the ground, akin to a cane toad's point of view. However, it meant finding alternative ways to converge the image. In response, Nichola made use of the differential between the SI-2K camera's 2/3 image sensor and the one inch C-Mount. This differential meant he, and post-production supervisor, Ben McNeill, had approximately 33 percent of image room to slide and converge the left and right eyes. In other words, despite a short pre-production period, Nichola and crew created several innovations that aided the creative aims of the film, specifically a smaller rig which could be used to capture the toad's point of view.

For scenes that included interviews of subjects, the filmmakers used a P+S Technik 3-D rig. This rig was also customised, although in this case it was changed to include Lewis's original 'mirror-box' design.[83] The 'mirror box', Lewis (2014) says, is 'basically a piece of silvered glass at 90 degrees inside a box'. It allows the interviewee to look straight down the barrel of the camera at a reflection of the interviewer's face, as if they are speaking directly to the audience. According to Lewis (2014):

> I always felt that, as an audience, you were watching or observing someone else's conversation. And so, I wrestled with this idea and I just felt like, 'well this story (*An Unnatural History*) was a first-person story and it was a character story and these characters should be talking to the audience and they shouldn't be talking to some reporter or some off-screen interviewer.

The mirror box provides an unmediated view in that the interviewees appear to speak directly to the audience. In terms of the story's thematic production, the mirror-box and interview scenes contrast against the cane toad scenes. They illustrate Lewis's study of Australia's diverse response to the toad, including violent and environmental responses as well as entrepreneurial, political, hallucinogenic, and industrial responses.

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[83] The 'mirror-box' technology was created with the help of cinematographer, Jim Frazier and used on *An Unnatural History*. It is referred to by other names. Errol Morris (2004), for example, refers to a similarly designed technology as an Interrotron.

4.14: *Cane Toads: The Conquest*: Tableau composition with stuffed and tanned cane toad hides.

For each interview subject, Lewis, Nichola and production designer, Daniel Nyiri, designed a tableau – or planimetric – composition (see figure 4.14). This composition served the production in two distinct ways. Firstly, it allowed the setting to be dressed in order to present basic contextualising information about each subject, such as cane farming equipment for a cane farmer, or laboratory tools for a laboratory scientist. Secondly, the set dressing acts to define a spatial environment, with props placed in the foreground, middle-ground and background. The composition also provides a sense of conflict that corresponds to the tension between the cane toad and the Australian interviewees. The tableau composition flattens the image while the D3D and set design imbue the interview scenes with depth.

In this way, the D3D is integrated into the documentary as a means of illustrating both sides of the story. It helps to present the toads' point of view. It also attempts to illustrate a human point of view, one that is expressed directly to the audience. When comparing *The Conquest* to *An Unnatural History* these visual themes are much more pronounced.

The fact that *The Conquest* and *An Unnatural History* tell versions of the same story means that the way the story is told, the separate approaches to visual technique and visual style, can be compared and contrasted to reveal D3D's impact. A comparative analysis, such as this, highlights the key changes to the production as well as some of the similarities. Some of the basic differences between the two films include different running times (*Conquest* is approximately 38 minutes longer); different aspect ratios (4:3 for *An Unnatural History* and 1.85:1 for *The Conquest*); predominantly different crews; and different production technologies. Meanwhile the story, the director, and many of the locations and subjects are consistent.

An illustrative example of the different aesthetic approach in *The Conquest* is the scene involving a Puerto Rican town hall. Featured in both versions of the story, the hall is where the toad is identified as a potential pest control of the greyback cane beetle in Australia (see figures 4.15 and 4.16). For *The Conquest*, Nichola (2014) recalls that:

> We shot the Puerto Rican town hall as elements and I did this a lot through the film. We set up for the afternoon; we waited for the sun to set; I filmed the façade, and I waited for the sun to set some more and filmed more of the façade. We didn't have enough lights, so we lit this bit of wall and that bit of wall, and we went inside and lit inside … I collected the layers, augmented the sky, added a tree (the car was a CGI layer) and then we filmed the toad entering the shot in the studio.

This indicates that in capturing the shot the filmmakers layered multiple images over each other, which took time and technical skill to achieve in principal photography and post-production phases. The choice of digital and D3D meant that the 'game had changed' and it now included these options. Nichola continues:

> Mark said [to me], "Thirty years ago we just stuck a camera there and a horse came through and it was done!". And I said, "Well, guess what! You chose 3D and we don't do it like that in this case". So, I forced his hand on that. It was a

whole different ball game. We're not shooting on film, we
don't have the ASA: we have none of that.

So, while the two films share many characteristics, their production contexts
were significantly different. Image capture and storage, contrast and parallax
ratios, left- and right-eye lens synchronisation, post-production corrections, and
so on, were now a factor for the *Cane Toads* crew and Lewis to handle.

4.15: *Cane Toads: An Unnatural History*. Subtle differences in the depiction of the Puerto Rican
town hall: a horse and cart moves from left to right.

4.16: *Cane Toads: The Conquest*: Subtle differences: an automobile moves from right to left.

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The differences in technique also extend to cutting styles. In regard to shot lengths, each film follows Salt's and Bordwell's identification of a broad trend toward shorter shot lengths in contemporary films. The ASL for *An Unnatural History* is 6.27 seconds per shot while it is 4.22 seconds per shot for *The Conquest* (see figure 4.17).

Film	Year	ASL	Director
Cane Toads: An Unnatural History	1988	6.27	Mark Lewis
Cane Toads: The Conquest	2010	4.22	Mark Lewis

4.17. A comparison of ASLs of *Cane Toads: An Unnatural History* and *Cane Toads: The Conquest*.

This decrease makes the latter film, like *TT3D*, close to the typical ASL bracket of dramatic feature films. Lewis (2014) points out that the crew 'tried to cut quick in 3D'. This intention combined with several other factors which also impacted on The *Conquest*'s cutting speed. For instance, the fact that the film would also be exhibited conventionally was another reason for faster cutting. According to Lewis (2014):

> We [the crew] were cognisant of the fact that when you're making a 3D film you're also making a 2D film, because a function of a 3D film is that you've got two eyes and one of those eyes is going to be your 2D film and the two eyes is going to be your 3D film. So with the audience of the two films, people are much savvier in terms of reading the imagery; they're not as worried about crossing the line and they're not as worried about who is looking in which direction. They are more accepting of quick cuts and jump cuts.

This is to say industry demand for variable exhibition of individual films in the digital screen period means that *The Conquest* was produced as a D3D film but with conventional screenings a factor in how the film was made. Stylistic choices needed to be made that would result in a good viewing experience in both formats.

In total the ASL differential between the two films is 2.05 seconds per shot. More illustrative of the difference is the fact that *The Conquest* maintains a

relatively consistent cutting rate throughout while *An Unnatural History*'s larger ASL coincides with greater shot length variation. *An Unnatural History* has a standard deviation of 6.96 seconds while *The Conquest* has a standard deviation of 3.69 seconds, which means the earlier film has a noticeably larger variation in shot lengths than the later film (Figures 4.18 and 4.19 show the difference in shot length variation and cutting styles between the two films).
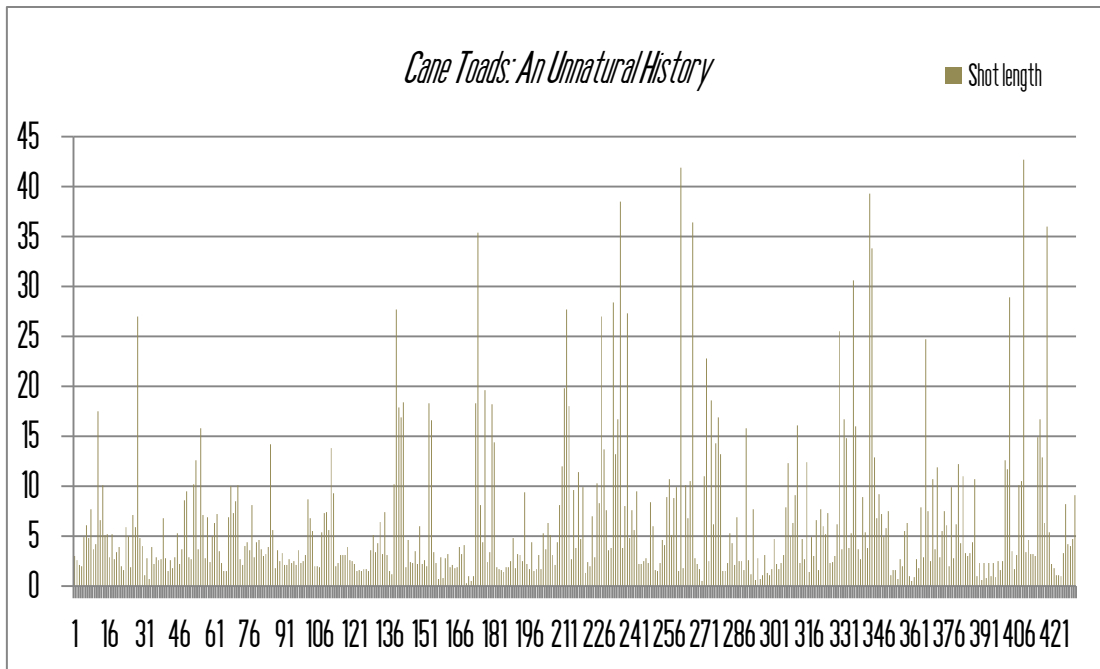
4.18. Shot length variation in *Cane Toads: An Unnatural History*.
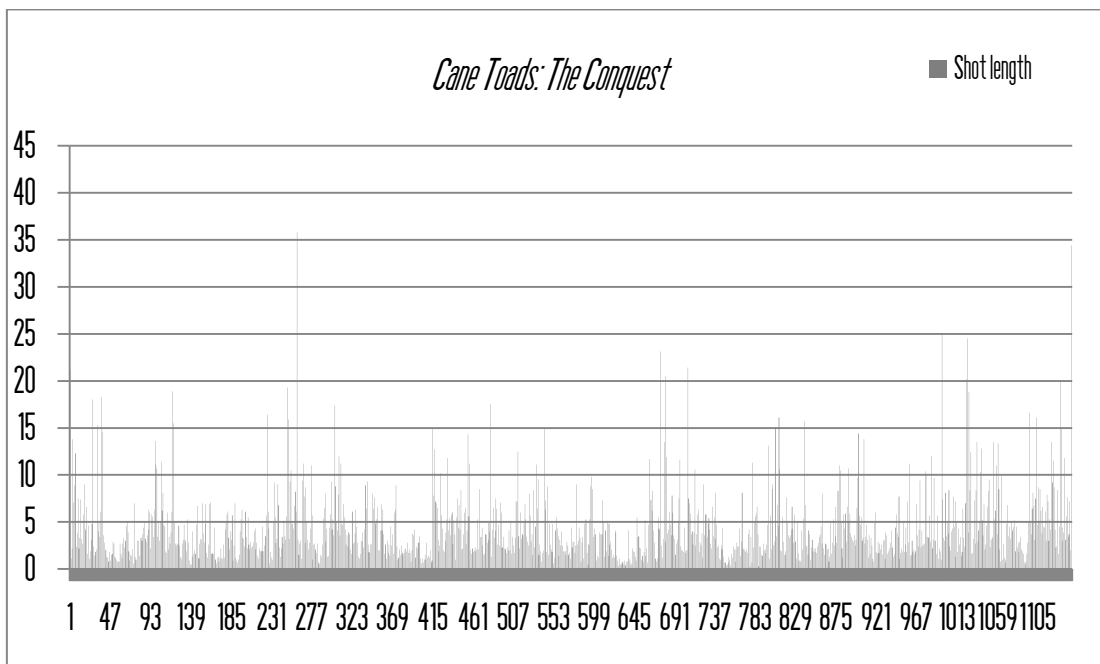
4.19. Shot length variation in *Cane Toads: The Conquest*.

An analysis of shot size, via a simple process of normalisation, illustrates other differences between the two films. For example, it shows that *The Conquest* has greater shot size variation. The shot sizes recorded in this analysis are 'Big Close-Up' (BCU), 'Close-Up' (CU), 'Medium Close-Up', 'Medium Shot' (MS), 'Medium Long Shot' (MLS), 'Full Shot' (FS), 'Long Shot' (LS) and 'very Long Shot' (vLS). Following Salt (2006), to normalise the count, each shot size is multiplied by 500 and then divided by the total number of shots in the film. Each type of shot is therefore measured per 500 shots, which avoids any comparative issues regarding the different lengths of *An Unnatural History* and *The Conquest* (see figures 4.20 and 4.21, and 4.22 and 4.23).

Cane Toads: An Unnatural History	
Shot Size	Percentage
BCU	14.25
CU	22.43
MCU	28.5
MS	12.15
MLS	6.54
FS	5.84
LS	10.05
vLS	0.23

4.20. Shot size analysis of *Cane Toads: An Unnatural History*.

Cane Toads: The Conquest	
Shot Size	Percentage
BCU	13.58
CU	25.47
MCU	20.11
MS	21.09
MLS	5
FS	3.22
LS	10.81
vLS	0.71

4.21. Shot size analysis of *Cane Toads: The Conquest*.
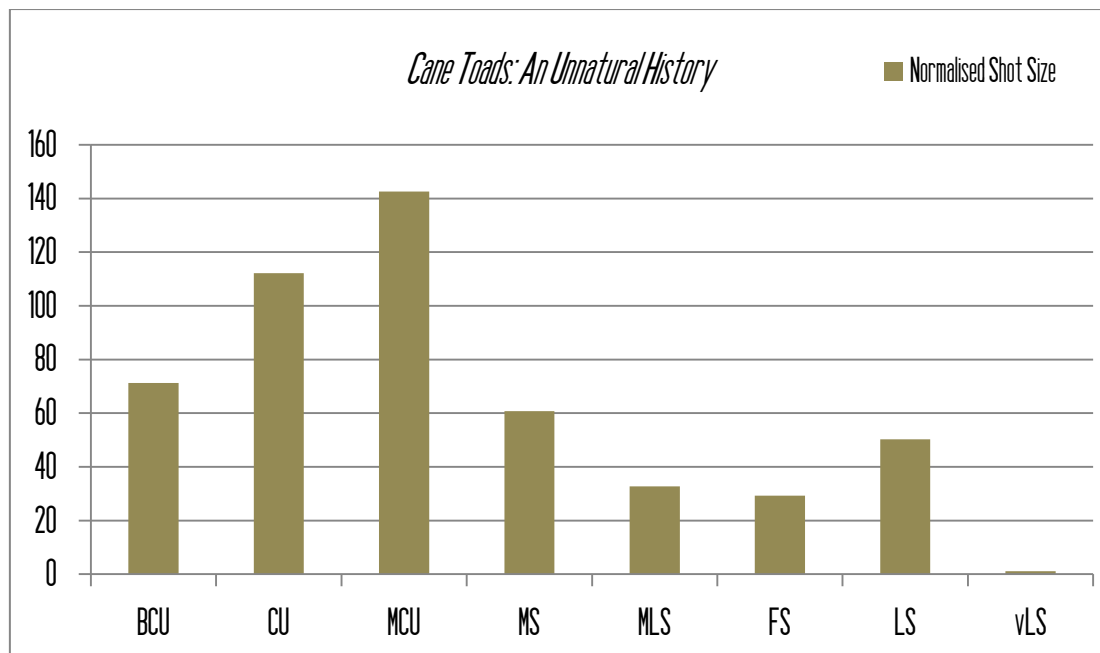
4.22. Normalised shot size analysis of *Cane Toads: An Unnatural History*.
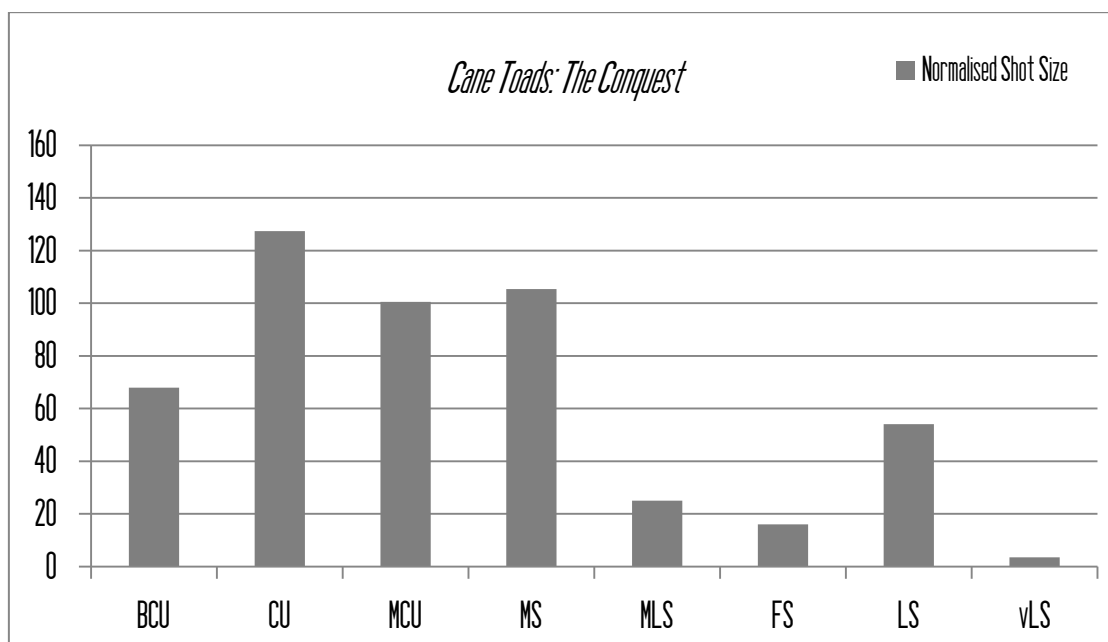
4.23. Normalised shot size analysis of *Cane Toads: The Conquest*.

As the data show, both films follow a similar shot size trend by predominantly using a combination of BCU, CU and MCU. This trend is somewhat unsurprising given the focus on small animals, which would require BCU and CU shot sizes, and human subjects, which necessitate a slightly larger MCU shot size.

The key difference between the two films regards the use of MCU and MS shot sizes. In *An Unnatural History* the dominant shot size is MCU (28.5 percent) with MS only being used 12.15 percent of the time. In contrast, *The Conquest* scales down the use of MCUs (20.11 percent) by increasing the use of CUs (25.47 percent) and MSs (21.09 percent). This feature is explained by, firstly, *The Conquest*'s adoption of a wider aspect ratio than An *Unnatural History*, one that performs equally well on cinema screens as it does on television screens. The ratio gave *The Conquest* a larger horizontal image space and more motivation to use MCU and MS shot sizes. The second explanation concerns the use of D3D. That is, the larger shot size enables the crew to fill the image with props that define and layer depth, and capture the interviewee subject's gestures and movements. This explanation is in line with Lewis's (2014) view of D3D:

> [It] works better when you shoot a lot looser. In other words when you're talking to a character and he's positioned back and he's using his hands – and some of them are very expressive with their hands – you get a layering of depth (foreground, middle and background).

In other words, the larger shot size aids in documenting and developing the film's spatial environment. It allows for the layers of depth and movement, and some fullness of character portrayal, to be defined and contextualised more clearly.

In addition to the differences in cutting rate and shot size, the two films also employ point-of-view (POV) shots and shots with camera movements, such as pans, tilts and tracking movements, in different ways (see figures 4.24). This comparison is calculated in the same way as shot size, where the numbers of POV and camera movement shots are tallied for each film and then normalised to provide comparative figures.

Normalised tally: POV and Camera movement shots										
Film	Toad POV	Human POV	Dog POV	Pan	Tilt	Pan w/ tilt	Track	Track w/ pan	Crane	Zoom	Zoom w/ pan
Cane Toads: An Unnatural History	38.6	18.7	0	15.2	16.4	24.5	19.9	0	1.2	11.7	1.2
Cane Toads: The Conquest	19.2	11.2	8.5	12.1	11.6	11.2	23.2	1.8	8.9	9.8	1.8

4.24. Normalised tally. POV and camera movement shots.

The results point to several areas of difference. For example, *An Unnatural History* includes a greater number of pan and tilt movements. *The Conquest* includes a greater number of crane movements, which is partially explained by the production being larger and better equipped. There is also a surprising drop in the number of point-of-view shots in *The Conquest*, once the Dog POV category, which is new to the cane toad story, is factored out. [84] This drop highlights a peculiarity of *The Conquest*'s production. Rather than using shots 'taken with the lens pointing along the direction of view of a character shown in the previous or subsequent shot' (Salt, 2006, p. 417), it positions the camera beside a POV position. The audience is next to a toad, a third-person subjective point of view rather than a subjective first-person point of view. It is a subtle difference, but the perspective has a significant creative implication for the treatment of D3D and the audience's response to the subject: it avoids asking the audience to embody a particular character, a toad, and instead maintains the audience's corporeality and asks them to witness the world from a position relative to the toad. It provokes an empathy with the speechless toad from the position of humanity, not reptile. In this way, Nichola's (2014) philosophy to '[migrate] the viewer into a viewing zone that they could not experience in normal life' takes on added significance for the creative treatment of D3D in terms of natural history documentary.

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[84] In regard to the Dobby scene, Lewis (2014) says that, 'people said that I created cinema history in creating the first 3D acid trip for a dog'.

More broadly, the results concerning ASL, shot length variation, shot size variation and the types of shots, including POV, illustrate the key differences in style between the two films. The adoption of D3D and other digital production technology and visual techniques is a core element of this difference. The approach to POV shots is particularly significant given the discussion of the D3D documentary experiential aesthetic as connecting the screen space with the audience's space in the theatre. This connection is significant in creative ways that make D3D distinct from conventional production.

Storm Surfers 3D

Storm Surfers 3D plays with a similar experiential effect; however, it is intended to elicit speed, intimacy and intensity. The effect occurs in relation to a ride film aesthetic, as in *TT3D*, where the audience is positioned in relation to a high-speed activity and a particular environment and then notionally compelled to 'go along for the ride' alongside a character. In *Storm Surfers 3D* the experience is big wave surfing in rough and often violent seas. The film merges first- and third-person points of view, a combination that is often used in digital games where the audience is positioned in close proximity to the protagonist and encouraged, via a process of narrative detail, to gradually empathise with and embody the protagonist role. The audience gets to experience a rush of big wave surfing similar to the 'real' thing without the consequences and risk. Consequently, the film is another example of an attempt to migrate the audience, through creative aesthetic choices that relate to D3D, into a particular environment, an environment that they are unlikely to ever experience (given the physical, financial and technical demands of the activity).

The risks associated with big wave surfing are developed in *Storm Surfers 3D* by the combination of expository and observational documentary elements that contextualise the characters and the ride film sequences. As in *The Conquest*, *Storm Surfers 3D* motivates the use of D3D along the lines of characterisation and conflict. That is, the film tells the story of the three man *Storm Surfer* team, namely Ross Clarke-Jones and Tom Carroll, both aging pro-surfers who now concentrate on big wave surfing. The team also includes Ben Matson, a surf forecaster (Maddox, 2012; Saunders, 2013). Over a four-month

period during 2011 (May to August), this team track the largest storm cells and then travel to big wave surf locations, such as Ship Stern Bluff in Tasmania (see figure 4.25), Depot Bombie in NSW and Turtle Dove Shoal, off the coast of Western Australia. In this way, the story follows a causal process of storm and waves that also details Clarke-Jones' and Carroll's motivation for big wave surfing. These themes ultimately converge in the final scenes of the film when the characters' motivation, the risks and big wave surfing result in a near-death experience for one of the characters. As one might expect, the use of D3D corresponds to the spatial characteristics that relate to the film's main themes, in particular Clarke-Jones' and Carroll's position relative to the towering waves during the ride film sequences.

4.25. Screen capture: *Storm Surfers 3D*

D3D Production, Distribution, and Exhibition

The idea of audience engagement and participation in the story is extended by the production into a multi-platform campaign that includes a host of productions: an e-book (*Mission Diaries*), social media sites (Facebook, Twitter, Instagram and Youtube), a soundtrack album, twenty webisode films that profile the cast and detail how they crew filmed in D3D, a rich media website, and an iOS and Android digital game (*Storm Surfers – Big Wave Hunters*). Rather than act as a transmedia story, as in other examples of D3D production,

the *Storm Surfers* franchise aims to support the primary work with further detail of the film's events and characters. The extra content is primarily a selection of footnotes that furnish the film with further detail. As such, the broader franchise aims to develop distinct levels of engagement and participation, which is manifest in both the use of a D3D experiential aesthetic and the 'worldbuilding' detail of the extra material.

Given this combination, it is a surprising fact that *Storm Surfers 3D* did not begin as a D3D production; initially the production was to be a conventional television documentary series. According to co-director, Chris Nelius (2014), the plan to film a series changed when 3net, a USA '24/7 D3D [television] channel' joint venture between Sony, IMAX and Discovery Channel, contacted the crew about producing D3D content. The channel was 'looking for content' to fill the 24 hour cycle. The *Storm Surfers 3D* crew pitched the idea of the series, '[3net] said "yep" and then [the channel] put up some money' (Nelius, 2014). The production then became a four, 52 minute, D3D episode series, which later screened on 3net in the USA, on Sky3D in the UK and Red Bull satellite channel, Servus TV. According to Nelius, 'I think [the producers] thought that big wave surfing in 3D was a bit of a no-brainer – who wouldn't want to see that – and we'd done it enough in 2D to have enough experience to have a crack at doing it in 3D. [85] The idea to re-edit the television material into a film for a cinema audience also began to take shape:

> [Justin, the producers and I] were thinking that no-one
> had really ever done this in 3D for the cinema before –
> although someone had done an IMAX movie called
> *Ultimate Wave Tahiti*, which is technically the first 3D big
> screen surf film, but apart from that there wasn't really
> much out there (Nelius, 2014).

During production, *Ultimate Wave* became an initial reference point for the crew in terms of how to use D3D.

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[85] Discovery Channel Asia had previously co-produced *Storm Surfers: Dangerous Banks* (2008) and *Storm Surfers: New Zealand* (2009).

Eventually, *Storm Surfers 3D* became a four-part D3D television documentary series and a D3D feature film. The additional feature film production meant that the producers could claim the higher feature film Producer Offset QAPE, leading to a budget of around $6 million (Maddox, 2012; Saunders, 2013, p. 146).[86] Screen Australia also directly invested in the production, which meant that the government body had a greater say in the development of the final film. According to Nelius (2014), Screen Australia 'wanted to see cuts and talk about that side of it as well ... [and] it all went very smoothly with them'. Funding was also augmented by Screen NSW's Digital Media Initiative and television pre-sales deals with 3net, Sky3D and Servus TV.

The film's initial exhibition campaign in Australia and in the USA was created around a four-wall model, a reference to similar roadshow exhibition releases of 1950s cinema as well as a number of 1960s and 1970s Australian surfing films (FitzSimons et al., 2011, p. 73).[87] 'It was', says Nelius (2014), 'a conscious decision to make it less like a traditional movie and make it more of an experience'. For example, over six weeks and 30 screens during 2012, Clarke Jones and Carroll travelled to locations across Australia. Each location had a screening of the film as well as a question and answer session with the two stars. A similar campaign occurred in the USA, specifically California, during 2013. Following it, the film was exhibited using a standard release model on approximately 70 locations (Saunders, 2013, pp. 152 – 153). DVD, VOD (Video-On-Demand) and DTO (Download To Own) release occurred simultaneously in February, 2013 (Saunders, 2013, p. 153).

### Ship Stern Bluff: Surfing As A Non-Character

What is unique about *Storm Surfers 3D* is the use of intimate first- and third-person camera angles during the surfing sequences. These illustrate a number of important elements, such as the surfer's body language in relation to the size of the wave and the intensity and speed of the surfing activity. The relative proximity of the camera – in other words the viewing position of the audience –

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[86] A feature film Producer Offset is set at 40 percent of QAPE while a television Producer Offset is set at 20 percent of QAPE.

[87] In Canada, the film had a simultaneous release in theatrical venues and online.

to the surfer and wave provokes the audience to assimilate the drama and action of the event. They participate in the protagonist's adventures as a type of non-character, or as someone who is present in the environment but has no control over that environment; in a way comparable to the of an audience on a simulator ride.

The Ship Stern Bluff sequence of 71 shots is a case in point. It depicts the two distinct modes of production in the film, observational and expository, as well as elements of ride film. The sequence was produced using a side-by-side Sony EX3 camera rig that was positioned on a boat to capture many of the sequence's LS; several Panasonic 3DA1 cameras placed on the back of jet skis; Sony TD10 cameras held by cameramen in the water; and a number of GoPro 3D Hero camera rigs mounted on surfboards, helmets, on poles (sometimes referred to as a handle cam) and on poles placed in backpacks. According to Nelius (2014), the biggest stroke of luck the production had was to begin production around the same time as the GoPro 3D Hero cameras came onto the market: 'Pound for pound that was the best camera we had'.
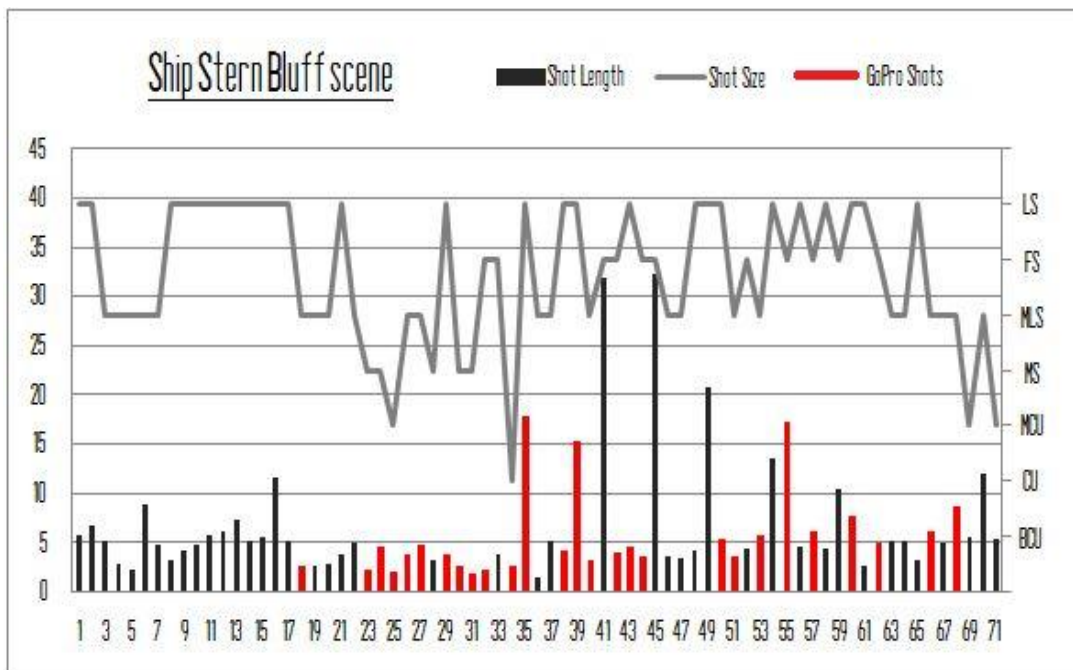
4.26. Ship Stern Bluff scene shot length, shot size and GoPro shots analysis.

Figure 4.26 is a compilation of shot length, shot size and GoPro 3D Hero shots data. The first part of the sequence (shots one to 24) shows the *Storm*

Surfer crew preparing equipment and travelling to the Ship Stern Bluff destination. It uses a mixture of observational and expository documentary modes, including narration and interviews with Clarke-Jones and Carroll regarding the location and their expectations. Shot size and length are relatively consistent during these 24 shots. The GoPro 3D Hero camera is introduced into the sequence in the latter stages (shots 18, 23 and 24), an indication of the filmmakers' intentions to transition into a ride film aesthetic. In the following shots, 25 to 71, the film's focus is on Ross Clarke-Jones and his surfing. This larger sequence of shots has greater variation in shot size and length. There is also a greater use of GoPro 3D Hero camera shots, which reflects an increase in first- and third-person point-of-view angles. That is, the objective third-person angles of the first part (shots 1 to 24) begin to give way in the second part (shots 25 to 71) to more subjective angles which treat the audience as if they are positioned at the point of the camera. Nelius (2014) describes this in terms of the audience being the camera:

> [The intention was that w]hen you're watching [a protagonist] surf, you feel like you are sitting in the water watching them. When Ross surfs the wave you are, bizarrely enough, lying on the board looking back up at him, and when he holds the handle cam you are there with him … It is experiential.

4.27: *Storm Surfers 3D*: Looking back at the audience (and making sure that the camera is framing the action correctly).

In particular, the functionality of the GoPro 3D Hero cameras means that they play a large role in the latter part of the sequence, with twenty-four GoPro shots included out of the 71 shots (or fifty-one percent of shots in the latter part). This increase in GoPro shots corresponds to an increase in shot variation. Shot sizes vary more quickly and the cutting includes some notable lengthier shots, which predominantly concern Clarke-Jones riding waves in slow motion.

The latter part of the sequence also oscillates between a first-person point of view and a third-person point of view, both of which are presented as subjective (see figures 4.27, 4.28 and 4.29). The oscillation between perspectives essentially blurs the two together and provides a complex example of the type of dual cinema experience that Miriam Ross (2011) describes: simultaneously taking part in the action and also reminding the audience of their position in the theatre. That is, it attempts to connect the audience's space with the screen space.

4.28: *Storm Surfers 3D*: a first-person point of view.

4.29: *Storm Surfers 3D*: A typical third-person point of view.

CHAPTER CONCLUSION

Storm Surfers 3D, *Cane Toads: The Conquest*, and other examples of D3D documentary show that the screen technology is largely taken up in order to achieve a connected screen and audience space. This uptake has corresponded to ideas about form and content unity which suit particular sub-genres of documentary. Event films, for example, have become a way for filmmakers to connect an artist, an occasion or a performance to a fan base. In this way, D3D helps to extend the experiential reach of the event, with fans potentially able to compress time and space in order to have an analogous experience to those that witness the artist, occasion or performance first-hand. The uptake of D3D in IMAX films works in a similar way, although technical and industrial factors of the format and corporation result in different experiences that nevertheless illustrate the idea of migrating an audience into an environment that they are unlikely to ever experience. In a broad categorisation, cinematic documentary feature films vary in form and subject, but ultimately draw on similar visual elements to achieve a migratory experience. Each of these sub-genres shares an intention to create an experiential aesthetic by connecting the two spaces together. D3D is used to position the audience as the camera, the protagonist and a character; as part of a diegetic audience and as part of a non-diegetic

audience; a fly on the wall; or as themselves, only miniaturised, in order to better empathise with a particular animal.

The two Australian case studies illustrate how Australian documentary films have integrated D3D into documentary production. In relation to *Cane Toads*, the existence of the 1988 film enables a series of comparisons to be made between the conventionally made film and the D3D film. This comparison shows distinct developments in regard to screen technologies and aesthetic approaches. *Storm Surfers 3D* offers an audience experience that includes speed, intensity and intimacy. The audience is positioned alongside the protagonist, as if they are riding on the same surfboard. Both examples claimed a PO from Screen Australia and also sold rights to exhibit the film in international theatrical and television markets. Broadly, in making this exchange between Australia and international markets, and cinema and television, the connected space and D3D extends beyond the limitations of previous periods.

Technological innovation and adaptation, which come under the broad umbrella of the industry's transition to digital production, are significant factors in documentary's uptake of D3D. Particular examples, such as Paul Nichola's adaptive technological creations for *The Conquest*, or the adoption and integration of new-to-market technologies such as GoPro 3D cameras on *Storm Surfers 3D*, demonstrate the flexibility of D3D technology to achieve particular creative aesthetic goals. The role of technology in these films, and in relation to D3D documentary production in general, recalls the key periods of the genre, such as the 1950s when light-weight cameras and sound equipment enabled filmmakers the opportunity to follow subjects and capture unique images. The transition to digital has afforded filmmakers the option to approach an experiential aesthetic in different ways not available in previous periods.

CONCLUSION

This thesis set out to answer the question, 'how are we to understand the significance of cinematic stereoscopy in the digital screen period?' It began by defining stereoscopy as a screen technology, a technology that is taken up in relation to a range of aesthetic, commercial and industrial factors. For stereoscopy, the relationship with these factors has not always been strong. In the 1910s and 1920s, 1950s and 1980s boom periods, stereoscopy failed to satisfy their needs, resulting in the screen technology's eventual decline. Repeated introduction and decline led to a dominant rise and fall narrative. Digital screen period stereoscopy (D3D) was similarly expected to follow this narrative arc. However, this view overlooks the fact that stereoscopy and each of the main factors change over time; they are not the same as they were in previous boom periods, their needs are different. This change means D3D has further possibilities of industrial, commercial, and aesthetic exploration and significance due to the different contexts in which it is adopted and integrated. It means D3D may be taken up and rejected or taken up and sustained.

One of the areas where D3D's significance is most contested is to do with artistic value. In some cases, as in Werner Herzog's view that D3D is only good for shooting 'porno' (Herzog in Wigley, 2011: 29), the screen technology's impact on film and film art is understated. In other cases, as in, director, James Cameron's and, studio chief, Jeffrey Katzenberg's respective claims that D3D is an 'evolution' and 'revolution' of film, the impact on conventional systems of production is decidedly overstated. In this context, Chapter Two tested D3D's impact on popular film art by exploring technique, visual style, and narrative form in D3D films. Several important characteristics of D3D were identified as a result of this analysis, including filmmaker approach to space in relation to narrative and time, and to the audience's relative position to objects on-screen. The analysis found that that these characteristics of D3D were taken up as a way to build on conventional production technique and visual style. That is, instead of being an artistically limited screen technology or an evolutionary step for cinema, D3D adoption and integration encouraged more moderate forms of

change and continuity by pushing filmmakers to broaden their existing approach to film production.

An example of this outcome concerns the combination of monoscopic and stereoscopic depth cues. In several notable examples, including productions by *auteur* filmmakers, such as Cameron's film, *Avatar*, Ang Lee's *Life of Pi*, and Martin Scorsese's *Hugo*, stereoscopic depth is combined with monoscopic depth in clearly identifiable ways. In most cases, conventional linear and aerial perspective compositions provide the foundation on which D3D devices, such as floating particles, aspect ratio variation, and mask breaks, define the illusion of a viscous and immersive three-dimensional space. The treatment of monoscopic depth in D3D production is a significant characteristic of the digital screen period. In particular, the combination in *auteur* films illustrates the point that established and respected approaches to filmmaking have absorbed D3D. In return, these approaches have broadened to include characteristics that work best in D3D.

The screen technology's impact on cutting shows that conventional and D3D production techniques have been combined. Demonstrating how this has occurred is difficult, however, because their combination has been masked by the general trend in Hollywood production toward shorter shot lengths. That is, D3D films have average shot lengths between three to four seconds per shot. This range is consistent with the trend in conventional production toward shorter shot lengths. Consequently, D3D does not lead to films with noticeably longer average shot lengths; however, it does have an impact on extremely fast paced action sequences. In these instances, filmmakers have typically responded to the screen technology by reducing interaxial and disparity values to create flatter images. These images avoid overloading the screen with depth information, which means editors can adopt a conventional, intensified continuity cutting style. Typically, this style is punctuated by set-piece action shots which, as in the example of *Resident Evil: Afterlife*, combine action with slow-motion photography and an emphasis on images with floating particle design. So, again, conventional and D3D techniques are combined.

The combination of conventional and D3D also has an impact on story. The new emphasis on visual depth is contextualised in many popular films by stories that have corresponding narrative complexity. These are narratives that transition within the diegesis between an actual and alternate reality, often focusing on world-making detail. Examples include *Avatar*, Tim Burton's *Alice in Wonderland*, as well as *Tron: Legacy*. *Legacy* is a particular example because it illustrates the way that D3D has been adopted into franchise production, coinciding with a change in the way franchises are structured and sold. Franchises, such as *Tron*, have taken up the narrative form in relation to the broader franchise production so that the narrative materialises across multiple media platforms and production sites. D3D adoption and integration distinguish the franchise from rival conventional franchise productions on the market, and act as a point of difference between productions within the franchise. In regard to the latter use, for example, only two out of seven productions in the *Tron* franchise include D3D. The two D3D productions represent significant points in the franchise narrative, points when the audience can enter and take in the story more easily. In short, D3D uptake corresponds to a trend in narrative form, which satisfies the need to contextualise techniques that emphasise visual depth as well as needs that relate to point of difference and financial returns on investment.

Film business is a significant factor for D3D. To begin, the screen technology and its application in creative film production require more funding than conventional production. In the digital screen period, producers have obtained funding by exploring a range of strategies, including government funding. This type of funding has precipitated a number of changes that distinguish digital screen period stereoscopy from previous boom periods. One change that Chapter Three focuses on is the relocation of a D3D production to the Australian national film industry context. Analysis of the Australian film industry and its funding policy, the Australian Screen Production Incentive (ASPI), illustrated the complexity of contextual factors at play in the uptake of D3D. These factors related to film business sustainability, and industry skill and infrastructure development. They also related to local filmmakers, who were shown to accommodate business and industry factors in order to source ASPI

funding for their respective D3D productions. In short, the funding has made the uptake of the screen technology more likely, and as a result more local filmmakers have begun to use D3D in their films.

This use is aligned with Tom O'Regan's notion of cultural and industrial exchange. O'Regan's argument helps to explain the application of Screen Australia's broad definition of Australian content and illustrate how the interrelated factors of foreign and domestic art, commerce and industry combine to recontextualise stereoscopy as a screen technology with domestic affordances. In this sense, Chapter Three refers to stereoscopy, a foreign screen technology, as being 'Indigenised' by Australian filmmakers, a significant characteristic of the digital screen period. The chapter's case study, Baz Luhrmann's *The Great Gatsby*, one of Australia's first D3D films, demonstrates the ways in which stereoscopy has been taken up in Australia and been approached by Australian filmmakers. In particular, it shows how Screen Australia's definition of Australian content, regarding the creative origination of the film, its production location, the nationalities of its crew, production expenditure, and other factors, provide a cultural and industrial context in which these filmmakers 'Australianise' the screen technology, albeit in negotiation with external factors, mainly Hollywood.

The *Gatsby* case study also shows how the filmmakers benefitted from satisfying Screen Australia's guidelines at the same time as the industry has benefitted from an investment cycle, which sees investment returned to the industry.In terms of the *Gatsby* production, ASPI funding helped the producers to defray risk, maintain long-term working relationships, and strengthen the adaptation process. It also meant that Luhrmann could define his particular, *auteurist* approach to D3D in relation to F. Scott Fitzgerald's novel, which materialises in specific ways to do with the transition of the story from novel to film. For example, authorship materialises in Fitzgerald's story and literary style; in Luhrmann's changes to Fitzgerald's framing narrative, which aided the production to orient the Nick Carraway character more clearly; and in Luhrmann's representation of psychological realism. The approach to D3D is a product of this mix. In particular, the film's D3D reflects Luhrmann's attempt to

relate Fitzgerald's story to a 2010s audience, with an emphasis on the corresponding socio-economic factors relating to the 1920s setting and the 2010s release. It is also used to visualise the internal struggles of characters. Luhrmann uses devices, such as moving particles and the negotiation of borders between audience and character, to define these struggles. In this way, the use of D3D to connect the audience to character and the film's spatial design unifies and mixes Fitzgerald's and Luhrmann's work together, a result that was, particularly at one point during pre-production, not possible without the financial help of the ASPI.

The use of D3D to connect the audience to the film's space has similarly been explored in D3D documentary. Chapter Four identifies three sub-genres of documentary which attempt to connect the audience to the subject's spatial context. These sub-genres are characterised as event, IMAX and cinematic documentary feature. They reflect established documentary modes of representation, most notably expository and observational. They also reflect the ways in which these modes and the 'creative treatment of actuality' are shaped by D3D, newly released screen technologies, the technical modification of screen technologies, and industry pathways to distribution and exhibition. Their approach to D3D as well as their treatment of actuality distinguishes them from similar conventional productions.

Chapter Four's main D3D documentary case studies, *Cane Toads: The Conquest* and *Storm Surfers 3D*, both use D3D in relation to spatial context. They represent two distinct approaches to D3D in documentary. The first, *The Conquest*, directed by *auteur*, Mark Lewis, incorporates an experiential aesthetic as a way to define responses to the film's conflicting protagonists, cane toads and humans. For example, to illustrate the toad's view, the audience is positioned alongside the animal. The result is the audience does not lose corporeality; instead they are prompted to empathise with the animal's situation. For the human subjects, stereo depth is combined with moments of direct address that connect the audience via a more intimate, one-to-one setting. These positions suggest that the story is told in a shared space. In the second film, *Surfers*, the approach to D3D similarly explores a space in this way.

The filmmakers, principally Chris Nelius and Justin McMillan, use D3D with subjective first- and third-person points of view. This approach is strengthened by the filmmakers' choice of a ride film aesthetic. The audience is made to feel as if they are positioned next to one of the protagonists on a surfboard as velocity stimuli rush past. The effect is visceral, and potentially immersive. Each example shows that the creative treatment of actuality materialises in ways that broaden conventional approaches to documentary subjects. The D3D helps to orient the audience within the context of the subject, which has the potential to strengthen the connection to and understanding of the film's subject.

Like *Gatsby*, *The Conquest* and *Surfers* were made with funding sourced from the ASPI. Funding was also sourced from various distribution and exhibition sector partners. Each film had different relationships with these sectors. The 2010 release of *The Conquest*, for example, showed that theatrical distribution and exhibition pathways had not been developed for D3D productions, and competing sectors, such as television, were interested in early exhibition dates. For *Surfers*, distribution recalled early surfing films, with limited release. This release coincided with other *Storm Surfer* franchise productions, none of which were made in D3D. In this way, each example reflects the way that D3D has expanded into the Australian film industry, and relates to various industry sectors.

These four chapters make up the thesis argument. Although they are thorough in answering the thesis question in terms of the main aesthetic, financial, and industrial factors impacting on D3D, it is clear that there are opportunities for further research. One opportunity relates to the notion of domestic uptake of D3D in relation to notions of indigenisation, with particular reference to an Australian context. For instance, in what other ways has D3D been taken up by Australian filmmakers and how does this illustrate the idea of an 'Australianised' screen technology?' and 'How has this materialised in relation to visual technique and visual style?' These are important questions for Australia's uptake of D3D. More broadly, there is also an opportunity to establish better analytical tools that measure the size and application of interaxial width and point of convergence. These measurements are often

difficult and time consuming to obtain, but would illustrate many important characteristics of the way D3D relates to visual technique and style. In this context, the relationship between D3D conversion practitioners and researchers is particularly important. The conversion process should mean that image depth data have been produced and recorded. These data could illustrate the treatment of depth in specific instances of production, and this would mean a clearer understanding of, for instance, Australia's uptake of D3D. I hope to take my research in these directions in the future, and I hope that others do too.

In concluding the thesis, my answer to the thesis question is based on the fact that digital screen period stereoscopy has a diverse range of affordances. These affordances make D3D significant for a number of reasons which relate to the multiple factors of art, commerce and industry practice. These factors shape and define D3D's uptake, affecting whether the screen technology is taken up and rejected, or taken up and sustained. Analysing the complex and changing ways in which they do so allows us to understand the diverse functions and significance of stereoscopy in the digital screen period.

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Space Station 3D. 2002. Toni Myers. Warner Home Video, 2010, Blu-Ray.

Spy Kids 3-D: Game Over. 2004. Robert Rodriguez. Roadshow Entertainment, 2003, DVD.

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Tangled. 2010. Nathan Greno and Byron Howard. Walt Disney, 2011, DVD.

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Transformers: Dark of the Moon. 2011. Michael Bay. Paramount, 2012, Blu-Ray.

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Tron: Legacy. 2010. Joseph Kosinski. Walt Disney, 2013, Blu-Ray.

TT3D Closer to the Edge. 2011. Richard De Aragues. Icon Film Distribution Pty
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The Ultimate Wave Tahiti. 2010. Stephen Low. Image Entertainment, 2011,
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Wild Ocean. 2008. Luke Cresswell and Steve McNicholas. Universal Sony
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William Shakespeare's Romeo + Juliet. 1996. Baz Luhrmann. 20th Century Fox,
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Wings of the Hawk. 1953. Budd Boetticher.

The Wonderful World of Dogs. 1990. Mark Lewis. Radio Pictures.

Woyzeck. 1979. Werner Herzog. Werner Herzog Filmproduktion.

Up. 2009. Pete Doctor and Bob Peterson. Pixar, 2011, Blu-Ray.

Yogi Bear. 2011. Eric Brevig. 2010. Warner Home Video, Blu-Ray.

APPENDICES

APPENDIX A: ETHICS APPROVAL

HUMAN RESEARCH ETHICS COMMITTEE

MEMORANDUM TO: A/Prof Dugald Williamson & Mr Dave Hare

                                  School of Arts

This is to advice you that the Human Research Ethics Committee has approved the following:

PROJECT TITLE:	Contemporary stereoscope
APPROVAL No.:	HE11-193
COMMENCEMENT DATE:	01 February, 2012
APPROVAL VALID TO:	01 February, 2015
COMMENTS:	Nil. Conditions met in full

The Human Research Ethics Committee may grant approval for up to a maximum of three years. For approval periods greater than 12 months, researchers are required to submit an application for renewal at each twelve-month period. All researchers are required to submit a Final Report at the completion of their project. The Progress/Final Report Form is available at the following web address: http://www.une.edu.au/research-services/researchdevelopmentintegrity/ethics/human-ethics/hrecforms.php

The NHMRC National Statement on Ethical Conduct in Research Involving Humans requires that researchers must report immediately to the Human Research Ethics Committee anything that might affect ethical acceptance of the protocol. This includes adverse reactions of participants, proposed changes in the protocol, and any other unforeseen events that might affect the continued ethical acceptability of the project.

In issuing this approval number, it is required that all data and consent forms are stored in a secure location for a minimum period of five years. These documents may be required for compliance audit processes during that time. If the location at which data and documentation are retained is changed within that five year period, the Research Ethics Officer should be advised of the new location.

Jo-Ann Sozou
Secretary/Research Ethics Officer

06/03/2014   A11/109

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INFORMATION SHEET for PARTICIPANTS

Research Project: *Contemporary Stereoscope*

I wish to invite you to participate in my research on above topic. The details of the study follow and I hope you will consider being involved. I am conducting this research project for my PhD at the University of New England. *My supervisor is Dugald Williamson of University of New England. Dugald can be contacted by email at dwillia7@une.edu.au or by phone on 02 6773 2036 and I can be contacted by email at dhare@une.edu.au or phone on 02 6676 2320.*

Aim of the Study:

An inquiry into the artistic, economic and technological functions of contemporary stereoscope in the three major visual entertainment mediums: cinema, television and gaming.

Time Requirements:

If the interview is face-to-face, it will last approximately 90 minutes and be audiotaped. If it is conducted via email it will take an equivalent time to complete. Additional time (estimated up to 90 minutes) may be needed to check a transcript of the interview and confirm information.

Interviews:

There will be a series of open-ended questions that allow you to explore your views and practices related to your knowledge of contemporary stereoscope in cinema, television and gaming. Following the interview, a transcript will be

provided to you if you wish to see one. Please note: any information gathered in the course of the interview may be used to illustrate ideas within the thesis and any related conferences or publications.

Participation is completely voluntary. If you decide to participate, you are free to withdraw your consent from the project and discontinue at any time without having to give a reason and without consequence if you decide not to participate or withdraw at any time.

It is unlikely that this research will raise any personal or upsetting issues but if it does you may wish to contact your local Community Health Centre (Sydney: Royal Prince Alfred Hospital [ph: 02 9515 6111]).

The recordings will be stored on the student researcher's password protected computer at the researcher's office after submission. The transcriptions and other data will be kept in the same manner for five (5) years following thesis submission and then destroyed. Only the investigators will have access to the data.

Research Process:
It is anticipated that this research will be completed by the end of 2014. The results may be presented at conferences or written up in journals.

This project has been approved by the Human Research Ethics Committee of the University of New England (Approval No. …….., Valid to ../../….)

Should you have any complaints concerning the manner in which this research is conducted, please contact the Research Ethics Officer at the following address:

Research Services

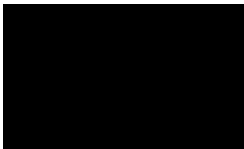University of New England

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Thank you for considering this request and I look forward to further contact with you.

Regards

Dave Hare

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Australia
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Consent Form for Participants

Research Project: *Contemporary Stereoscope*

I, ..., have read the information contained in the Information Sheet for Participants and any questions I have asked have been answered to my satisfaction. Yes/No

I agree to participate in this activity, realising that I may withdraw at any time.
Yes/No

I agree to having my interview voice recorded and the content transcribed, or written responses recorded via email. Yes/No

I agree that research data gathered for the study may be used in a thesis and may also be used at a conference or other publication. Yes/No

I agree to being identified in such outcomes. Yes/No

I agree to being quoted in such outcomes. Yes/No

....
Participant Date

....
Researcher Date

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SAMPLE INTERVIEW QUESTIONS

*This is Dave Hare recording an interview with .... on ../../2014.
.............., for the tape could you tell me your name and your role on the D3D
film, ...:*

1. Could you give me a short biography of your filmmaking career, and how you became interested and involved in D3D production?

2. Could you explain your role on the D3D film, ...?

3. Can you explain how the film, ..., is different to most other D3D (or similar genre) films?

4. Can you describe the film's visual style? Do these approaches change when using D3D? Why?

5. Can you describe some of the instances when you/the production played with D3D and used positive-parallax shots?

6. Can you outline the pre-production process for a D3D production? Was there a "depth" script or something similar that you worked on during this time? (How did the production come to decide on the point of convergence for particular shots etc?).

7. How were the duties split between yourself, and the other major D3D collaborators (that is, the director, another stereographer, camera crew, and so on)?

8. Why do you think the .... production suited D3D?

9. Can you outline the way that D3D was treated and elaborate on what makes the parts of your process significant?

10. What films did you look at as a reference source for ....?

11. Can you describe the use of sound in the film in relation to D3D? Were you conscious of the use of sound or how it was being designed when you were designing the stereo depth?

12. Can you describe the types of cameras that the production used and why they were necessary?

13. Can you describe the role of technology on the production?

14. Was VFX used? Can you explain VFX in relation to D3D?

15. Can you describe what a 3D-2D-3D transition is and how it was used on ....?

16. Can you discuss D3D in relation to documentary? Why do you think it works in the documentary form?

17. During the distribution phase, at what point did you have any definite interest from distributors in the finished work – for exhibition or festivals or other?

18. How was the film distributed?

19. What kind of remuneration has there been from ...., financial or other?

20.What was the greatest challenge in making ...., particularly in relation to D3D?

Thank you.