CURRENT DEBATES

‘Celluloid or Silicon?’
Digital Cinema and the Future of Specialised Film Exhibition

Stuart Hanson

Over the past twenty years I have attended a number of ‘demonstrations’ of digital video technology. Often the video images produced are of outstanding quality. But in spite of all the speeches, the brochures, the white wine and the canapés, I have never seen a video projection, analogue or digital, which looked like projected film. (Cox 2002)

Cinema’s future is currently claimed to rest with the development of electronic cinema (e-cinema) and digital cinema (d-cinema). In many instances the terms are used interchangeably, though broadly speaking e-cinema is concerned with the development of digital technologies across the levels of film production, distribution and exhibition, whilst d-cinema is concerned with distribution and exhibition. According to Watson and Morris, d-cinema can be defined as ‘the projection of full-length feature films to audiences in a purpose-built cinema where the quality of projection is not less than that provided by current 35mm technology’ (2002: 5). Put more simply, ‘digital cinema’ refers to the distribution and exhibition of feature films to cinemas for theatrical screenings. In large part this means material that was originally shot on film and subsequently transferred into digital form (often referred to as ‘telecining’). For the purposes of this discussion the definition of d-cinema largely excludes the production and post-production stages of film-making. As Culkin and Randle (2003: 81) point out: ‘For years to come, many or perhaps most mainstream motion pictures will continue to be shot on 35mm film, and that it is in mastering, distribution and exhibition that the current d-cinema revolution is taking place’.

Film Distribution

When a film is released, enough prints must be made for each cinema where it is to be shown. These prints all derive from the original nega-
tive that is assembled after the film has been edited and mastered. This original negative is extremely valuable and cannot itself be used to make subsequent copies, so an interpositive is made from which an internegative is produced. This internegative is then used to make prints for cinemas. The costs of making both an interpositive and internegative are considerable, especially since the numbers of prints that can be produced using the internegative are limited because it wears out during the production process. Each internegative can produce about 1,000 prints before it needs to be replaced. The quality of the prints produced is determined in large part by the quality of the internegative, but also by the conditions of the production process itself, especially the care taken handling the stock. Having produced prints, the distributor then has to ship the prints in metal canisters to cinemas. Increasingly, with the synchronising of world-wide releases, partly to maximise publicity and partly to thwart film piracy, the major Hollywood studios have to ship these prints around the world to arrive in time for a common launch date.

According to the UK film Council (2003) a film like one of those in the *Harry Potter* series is released in the UK with more than 1,000 prints. Each of these can cost upwards of £1,000 to strike, to which must be added the costs of distributing from refrigerated warehouses. Increasingly, the box-offices of many countries in Europe and around the world are dominated by a small number of such 'tent pole' pictures. Thus during 2005, 467 films were exhibited in Britain and the Republic of Ireland of which the top five took a quarter of total box-office receipts (UKFC 2006c).

The potential for cutting costs in the area of distribution is of obvious attraction to the major Hollywood studios, especially since most of them operate distribution arms as well. According to Katz et al. (2002: 3), Hollywood film studios ‘spend over US $1-billion each year to duplicate, distribute, rejuvenate, redistribute and ultimately destroy the thousands of film reels required to bring the close to 500 films released each year’. But this could give rise to the suspicion that digital distribution and exhibition may be less of a technical revolution and more of an economic one. As Belton (2002: 104) argues: ‘Digital projection is not a new experience for the audience. What is being offered to us is simply something that is potentially equivalent to the projection of traditional 35mm film’. Indeed, a spokesperson for a major digital cinema company explained that the goal of digital cinema is ‘to provide the image quality of a first run motion picture on 35mm film stock projected on opening night at a premier theatre’ (Steve Morley cited in Belton 2002: 105). In posing the question ‘what problem is electronic
cinema trying to solve?’, Slater (2002: 42) similarly disregards any potential arguments about the quality or otherwise of the projected celluloid image.

Apart from the production costs there are other issues with the process of striking prints, not least issues of quality control and wear and tear. Negatives are struck from what is already a copy (the inter-negative), which can often degrade the quality of the images. Moreover, the prints themselves are prone to scratching, stretching and breaking whilst in use, especially by multiplex cinema projectionists who may be supervising ten or more screens from a single projection box. If one went to see a film such *King Kong* during the week it opened one would have seen a new print at whatever multiplex one visited. In the USA it was released by Universal Pictures on around 7,500 screens in 3,500 cinemas, with a further 6,000 screenings on its international release. However, if one went to see a film like Mike Leigh’s *Vera Drake* (2004) the chances are that one would have seen an older print, unless one had seen it at one of the few cinemas that showed it as a first-run. Critically acclaimed films like *Vera Drake* are released on as few as forty prints in the UK, due in large part to the cost of prints and advertising (P & A). *Vera Drake* was a small budget film (£4.5 million, of which £1.25 million came from National Lottery via the UKFC’s Premiere Fund), produced and distributed in the UK by a small independent producer (Thin Man Films) and distributor (Momentum Films). Utilising money from the UKFC’s Specialised Prints and Advertising Fund – effectively a state subsidy – the number of prints was doubled to eighty. Notwithstanding Hollywood’s ‘tent pole’ features, even larger British films might be released with only seventy prints, whilst the average number of prints of a foreign language film available to cinemas at any one time is eight (UKFC 2003).

**The Digital Image**

Unlike celluloid, Willis (2005) argues, when the transfer of information is characterised as transcription, digital is characterised by a process of conversion. In the digital realm the image is effectively ‘detached’ from its physical carrier (Loranchet 2005). The detaching of the image from the realm of the photo-chemical to that of ‘bits and bytes’ provides one major rationale for the switch from celluloid to silicon: that of duplication. As Willis (2005: 6) observed: ‘Each time analogue video (or photochemical film) information is copied, some of the original fidelity or precision is lost in the process of transcription, causing image quality to suffer and limiting the number of copies that can be made’.

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Digital cinema, it is claimed, will be nothing short of a revolution for this process. A digital cinema distribution master (DCDM) will be created either from the original film negative (first generation) or from the digital data produced if the film was shot on digital camera. Any adjustments to colour, contrast and other image facets are carried out digitally before this master is used to duplicate digital copies. Though initially expensive (estimates vary from US$25,000 to US$150,000 – see Culkin and Randle 2003), the cost of a DCDM will reduce, it is claimed, but, more importantly, the copies made are perfect and are not subject to decay or wear and tear. The process can also be retrospective – if a film is not already in digital form, it can be converted to digital. The motion picture is then supplied to the cinema as digital data rather than as a reel of film. It is then perhaps difficult to think of it as a film since, according to Culkin and Randall (2002), the term becomes an anachronism.

Though the digitalised film is currently contained on a series of disks delivered to cinemas, d-cinema might in future also entail the delivery of the film via satellite or broadband Internet (‘point-to-multipoint transmission’). Once in the cinema, the film is stored on a server until screening. The film is projected onto the cinema screen by a digital light processor (DLP) which generates an image by bouncing light off three chips covered with over a million tiny, individually moveable mirrors. The technology was based on the work of the US-based company Texas Instruments, though rival systems are being developed by other large multi-national electronics corporations, such as JVC’s Image Light Amplification system (D-ILA). At the moment however, DLP is the most popular technology and is currently installed in some of Britain’s most prestigious cinemas, including the Odeon Leicester Square in London.

Specialised Cinema and the Promise of Digital

The implications for cinemas, and for independent and arthouse cinemas in particular, are popularly expressed as an opportunity to diversify programming and reduce the costs of distribution. According to the Department for Culture, Media and Sport (2002: 43): ‘D-cinemas’ schedules can be changed much more frequently, responding both to market conditions, different audience groups, and varying deals with distributors.’

In part this flexibility rests upon the costs of duplication relative to those of celluloid, since the existence of a digitalised master means that making copies is substantially cheaper. However, the current high cost
of DLPs is a severe restriction on their widespread adoption, particularly in smaller, independent cinemas and small chains. Currently, a top of the range 35mm film projector costs approximately £30,000 to £50,000 and can last between twenty and thirty years, or even more, with regular maintenance. Moreover, if we disregard formats like IMAX, a film projector has little inbuilt obsolescence since many of the developments that take place with 35mm film do not affect its ability to be projected. As a report for Screen Digest observed: ‘All the resolution is built into the medium rather than the mechanism for displaying it, which only needs a strong light source’ (von Sychowski 2003: 26). A digital projector costs upwards of £100,000, and may well be obsolete in five to ten years. A further problem for exhibitors is the fact that a 35mm film projector can recoup its costs in approximately five to seven years, whilst a digital projector is not expected to do so before it is obsolete (Loranchet, 2005).

In an effort to promote the technology in the UK, a public body, in the form of the UK film Council (UKFC) has intervened strategically and launched an £11.7 million initiative called the Digital Screen Network in order to stimulate d-cinema. The scheme was open to all licensed cinemas with a proposal to equip over 240 screens in 200 cinemas (7 per cent of screens nationally) across Britain with DLPs over a period of eighteen months. The cinemas in the scheme range from subsidised art cinemas through small independent cinemas to large multiplex chains. The UKFC’s stated aim is to ‘improve access for audiences UK-wide … so establishing a balanced and inclusive geographical spread of cinemas’ (UKFC 2006a). By January 2007 the Digital Screen Network was virtually completed.  

Participating cinemas will guarantee to show a pre-determined number of specialised films each month, including foreign language films, in return for the installation and maintenance of the equipment. The Digital Screen Network will involve the supply of films for programmed slots booked centrally; beyond that the normal business models apply. Though the equipment supplied will be technically the most advanced available on the market, the initiative is intended specifically to increase the availability of and audience for specialised film. According to Screen Digest (2005: 84) the aim is to increase audiences in the areas of the country targeted (around 11 million admissions) by 35 per cent. Peter Buckingham (2005: 46), the UKFC’s Head of Distribution and Exhibition Fund, argues that each of the cinemas in the scheme...
has committed contractually to playing more specialised films than they did in 2003, and to market and promote these shows. Therefore, at the end of this process, there will be a completely different landscape for distribution – and specialised films will have more of a chance of being watched.

The UKFC’s definition of ‘specialised’ in this context is quite broad, however, and relates to those films that do not sit easily within a mainstream and highly commercial genre. The specialised cinema sector in Britain is difficult to quantify accurately, though the UKFC commissioned a major study into the specialised exhibition and distribution sector in 2002 (Watson and Morris 2002: 8). The authors of the report identified certain key characteristics of specialised cinema including ‘a film whose language, form or subject matter tends to result in it obtaining only a limited release’; ‘a film which is initially targeted and/or marketed at a niche market’; ‘a film which is released with less than 50 prints’; ‘films which normally reach a more limited market than mainstream releases (e.g. classics)’; or ‘films which may not have a wide or global appeal or may address a specific section of the community’.

Specifically the UKFC will consider the following criteria when assessing whether or not a film qualifies as specialised: foreign language with subtitles (in all cases); documentaries; archive/classic films. For films that do not fall into these categories, the UKFC applies other criteria, notably: those films that do not fall into what it calls ‘popular and recognisable genres’; those films in which the subject matter is considered ‘more complex and challenging’ and ‘less easy to communicate’; and films that ‘are often characterised as having a more innovative or unconventional storytelling style or aesthetic and may deviate from the straightforward narrative structure found in mainstream cinema’ (UKFC 2006b). The list implies that specialised films constitute a small proportion of the total films released in any one year; however, the reality is that films viewed as ‘non-mainstream’ make up half of the total (Watson and Morris 2002: 8). Their distribution is restricted primarily by the small number of prints struck, whilst venues showing them are limited and cinema runs are short.

Specialised cinema exhibition can be distinguished from a broader commercial independent sector not just by content but through a complex system of financial support and charitable status. There are many subsidised arts cinemas, such as the British Film Institute’s (BFI) Regional Film Theatres (RFTs). The majority of the cinemas operate as independent charitable trusts, whilst others are controlled by local authorities or educational establishments. RFTs do not constitute a circuit, though in the past many have benefited from a centralised booking service provided by the BFI. Most screenings of specialised
films take place in London, Britain’s major cities and university towns. Indeed, according to the Greater London Authority (2003: 48), 27 per cent of all cinema admissions take place in Greater London.

There is also a network of independently-owned cinemas, some of which are supported financially by the BFI through grants, with others supported through film booking and publicity services. Overall, independently-owned cinemas account for 32 per cent of screens in the UK, though for only 17.5 per cent of box-office revenues (Screen Digest 2005). Finally, there is a plethora of part-time facilities in arts and community centres, including film societies and mobile touring cinemas. With multiplex cinemas operating on admissions of approximately 50,000 per screen per annum (and up to 80,000 depending upon location), the commercial independent sector often operates on the basis of 20,000 to 30,000 admissions per screen per annum with consequently narrower profit margins (Baker et al. 2002). D-cinema’s potential for liberalising the market for specialised films and widening the audience is thus an economic one, as is clearly articulated by the UKFC:

Why would distribution supply those cinemas with more specialised content? The big barrier, i.e. the cost of 35mm print, is gone. It will cost £84 to put a film on a disc, put a security key on and then deliver it to the cinema. Now that the barrier has been removed, all that remains is to connect with the audience. Cinemas will be able to be more flexible with their programming, and respond to audiences. From a distribution standpoint, there is also much more flexibility in terms of marketing campaigns. (Buckingham 2005: 46)

This is a persuasive argument when applied to new or recent releases; however as Ian Christie (2006) has recently pointed out, the cost of showing films digitally (£100 for each film delivered by the UKFC’s supplier) is greater than that of showing old 35mm prints. The view that digital distribution would ‘revolutionise the business’, Christie argues, should be tempered with the likelihood that it will benefit the studios rather than those who wished to see a ‘more diverse and international film culture in Britain’.

All of which points raise a number of questions about the future of specialised film in the context of the development of d-cinema.

**Is There a Demand for More Specialised Film in Cinemas?**

The concern underlying the UKFC’s Digital Screen Network is that there are not enough screens or venues dedicated to the exhibition of films produced outside the mainstream (mainly Hollywood) studio
system. This perception should be seen in the context of a year-on-year rise in the numbers of screens in the UK, particularly as a result of multiplex cinema developments since the mid-1980s (Hanson 2007). Nevertheless, despite an increase in screens there are still not enough for all of the films made. This is the case for both English and foreign language films, and is exacerbated by the tendency for multiplexes to hold over certain films for successive weeks. This is in large part because the decisions on which films to programme, made by the large multiplex chains’ central buyers, are based on judgements about whether they are able to play profitably for a month or more.

The British Screen Advisory Council (BSAC 2000: 8), in its submission to the UKFC on the future of cinema in the UK, identified what it saw as two major reasons why there were not enough available screens:

There would appear to be a glut of films targeted at mainstream audiences, which dominate the programmes in the multiplexes. Even in areas which are regarded as being over-screened, the evidence suggests that market forces tend to encourage rival local multiplexes to show the same selection of titles as each other rather than to target niche audiences. It seems that the expected return on investment in two- or three-screen cinemas dedicated to non-mainstream movies is rarely sufficiently high for commercial operators to justify building independent circuits around the country.

There is thus a clear perception that specialised cinema is ill-served by the market. Indeed, in their report for the UKFC, consultants KPMG (UKFC 2002: 20) explicitly argued for a more interventionist strategy to correct what they saw as ‘market failures/structural weaknesses’. They continued:

The result of these failures is that a sub-optimal number of specialised films are shown and viewed by a very narrow and small audience. Consequently, addressing market failure in the specialised sector in the most simplistic terms means to take steps to ensure that films are available, and released/broadcast to the public, that otherwise would not be seen. (ibid.: 21)

One of the strategies to deliver more independent and arthouse films to audiences (or perhaps vice-versa), and thus to encourage a more diverse film culture, is to extend the subsidising of digital screens to include the major multiplex circuits. Screens in multiplexes owned by Vue, Cineworld (formally UGC), UCI and Odeon are included in the UKFC’s Digital Screen Network. Commenting on the launch of the scheme in the West Midlands area, then Films Minister Shaun Woodward made the case for their inclusion on the basis that this would enhance choice for cinemagoers and promote a more diverse market.
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‘Digital cinema’, he argued, ‘allows independent films to be distributed beyond city centre art house cinemas and into the multiplexes. That’s good news for film buffs and for the UK film industry’ (Government News Network 2006).

Will the Advent of D-Cinema Lead to an Increase in the Production of Independent and Arthouse Films?

The UKFC’s Digital Screen Network is primarily about promoting and building a wider audience for specialised and non-mainstream cinema. At the same time there is also an implicit realisation, expressed via references to the compression, mastering and delivery of digital films, that this might encourage film production. In his report on lower budget British films and their value in the world market, Simon Relph (2002) pointed to the potential cost advantages of shooting on digital video (DV) and of digital post-production processes. Moreover, he argued that a move to shooting on DV might be implicitly supported by the development of high-end digital projectors. Ultimately, Relph’s report was concerned with how British films could be made more cheaply, since the average production costs exceeded the average box-office takings by some margin. Nevertheless, head of Odeon digital cinema, Marc John, argued that digital cinema will encourage a greater democratisation of film-making: ‘We are looking at being able to more easily screen works from a kid from the housing estates of Newcastle or a graduate fresh out of film school, for example. But the work still has to be commercially viable’ (quoted in Carus 2003).

Diversity seems to be the watchword in discussions of d-cinema, and especially its potential for the exhibition of a range of material, including not only feature films but documentaries, short films and archive material, to a wide range of both general and more particular audiences (UKFC 2002). It is difficult at the moment, however, to get a clear sense of whether digital exhibition will provide a stimulus to greater production of specialised or non-mainstream films. Alan Parker, the UKFC Chairman, has argued for the reinvention of the UK as a ‘film hub’ and ‘creative core’ which ‘consistently creates British films that attract worldwide distribution and large audiences, while still using subsidy to support cultural production and new talent’ (Parker 2002: 9). The key to success, Parker argues, lies primarily in the distribution of films, though it is less clear what role exhibition, in the form of digital cinema, will play.

Though the UKFC’s Digital Screen Network is not in itself a distribution company, it is pledged to make available small-budget British (and
non-British) specialised films in digital format. Allied to the UKFC’s other production, distribution and exhibition initiatives (such as the New Cinema Fund, Premiere Fund and Digital Shorts) it may have a positive effect on specialised and independent film production. Only time will tell. John Woodward, Chief Executive Officer of the UKFC, speaking at a recent conference organised by the British Screen Advisory Council, did not see digitalisation of production, distribution and exhibition as being unequivocally good for independent and specialised film:

The first thing that occurred to me is that the supposed flexibility offered by the digital world doesn’t actually mean more opportunities for British distributors and producers. The flexibility offered by the digital projectors which are going into cinemas around the UK and around the world doesn’t necessarily mean more choice. It could result in *Star Wars* being shown in 15 screens rather than in 10, resulting in independent product and British product actually being squeezed right off. (BSAC 2006: 53)

*Are There Differences Between European and American Approaches to Developing Digital Cinema?*

The initiative undertaken by the UKFC has few precedents globally, certainly in terms of its scope. In continental Europe, Europa Cinemas – supported by the European Union’s MEDIA Programme – have set up a series of initiatives to ‘assist theatres in their transition to digital cinema’ (Europa Cinemas 2005), including financial support for the installation of digital projectors. Like the UKFC’s Digital Screen Network and its focus on specialised or ‘non-mainstream’ film, the continental European initiative aims to encourage and support specifically European film.

These initiatives share a common feature: state intervention through subsidy. In the UK and continental Europe the strategies are bolstered by a desire to promote specialised and, by implication, domestic film cultures. In both of these initiatives the spectre of Hollywood looms large. In the USA the development of digital cinema is not being driven by a public subsidy model; rather, the diffusion of the technology has been more happenstance. In part this has been due to a desire on the part of the major studios to determine a set of standards for digital cinema across the various levels of the film-making process. Moreover, there has been a vigorous debate between producers and exhibitors about the relative benefits of the technology. As Katz *et al.* (2002: 2) observed: ‘it is the studios that have the most to gain in the short-term, as they currently bear the brunt of the print and distribution costs, an
estimated $1 billion per year in the US. The exhibitors thus have limited incentive in the short-term to shell out $150,000 to $200,000 per screen to upgrade their theatres’.

Speculations

It is possible to think of the key context for these debates on the development and future of digital cinema as the space between film production and consumption, what Harbord (2002: 149) characterised as ‘the arena in which film is circulated’. There seems no doubt that we will see an increase in the number of ‘films’ shot on digital video, particularly as a way for independent and small-budget film-makers both to reduce costs and get their films made. Moreover, the advent of High Definition Television (HDTV) services will stimulate the production and distribution of more digitally recorded content, such as sport and drama.

However, the future for digital projection in cinemas is less clearly defined. As we have seen, there exists a tension between two broadly defined forces. On the one hand there are those initiatives, largely the impetus of state-funded bodies such as the UKFC, to subsidise the installation of digital projectors as a way of stimulating interest in specialised film. On the other there is the film industry itself, dominated by the large Hollywood studios and their affiliated distribution network, which is more circumspect about future developments. David Hancock (2005), Screen Digest’s Senior Cinema Analyst, summed up the situation concisely:

The digital cinema market is now entering a deployment phase ... The key players now have a chance to position themselves for the cinema market of the future. It is striking that several territories are moving ahead on their own paths, not waiting for the main industry drivers: the US studios. However, as many of these pioneering systems are low-to-mid range, high-end deployments will not begin in earnest until the studios themselves enter the global fray. Digital distribution and exhibition is about to replace the multiplex as the next battle ground for the re-generation of cinema economics.

Assuming that, with the establishment of a set of standards for digital cinema (Digital Cinema Initiatives5), the major studios begin to consider digital projection in earnest, it is perhaps possible to consider a future in which digital projection will replace traditional forms of film presentation. In the meantime, the landscape is uncertain. The advent of d-cinema might be the saviour for specialist film in the short term, but one also wonders if the consequence of these developments will be the end of celluloid itself.
‘Celluloid or Silicon?’

Notes
1. In October-November 2000 a road-show called ‘Celluloid or Silicon?’ toured the UK. It was organised by the ELFIN (Electronic Film) consortium which comprised of British companies with an interest in electronic cinema. The road-show was supported by two government departments: the Department of Trade and Industry (DTI) and the Department for Culture, Media and Sport (DCMS), plus local authorities and agencies in Scotland, Wales and Northern Ireland. According to the organisers: ‘The idea was to demonstrate the range of things possible with digital, whether shooting a low-budget film on a high street digital camcorder or using the most advanced digital equipment available. A broad range of material and equipment was thus included, the only exception being the highest end 35mm like digital projection already available in cinemas in London, Birmingham and Manchester’ (DCMS 2002: 4).

2. In 1988 the team responsible for restoring David Lean’s Lawrence of Arabia (1962) discovered that the original negative had been almost irreparably damaged because it had been run through a printing machine over 200 times in order to make theatrical prints (Morris and Raskin 1992).


4. A list of participating cinemas can be found on the UK Film Council website (accessed 20 January 2007) http://www.ukfilmcouncil.org.uk/cinemagoing/distributionandexhibition/dsn/dsnlistcinemas/

5. In 2005 the seven major Hollywood studios came together to form a company called Digital Cinema Initiatives (DCI) in order to produce what was called the ‘Digital Cinema System Specification’. This sets out industry-wide standards for the mastering, distribution and theatrical playback of digital content.

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Stuart Hanson is Senior Lecturer in Media Studies at De Montfort University, Leicester. He has written on cinema-going and the development of the multiplex cinema and is author of *From Silent Screen to Multi-screen: A History of Cinema Exhibition in Britain Since 1896* (Manchester University Press, 2007).