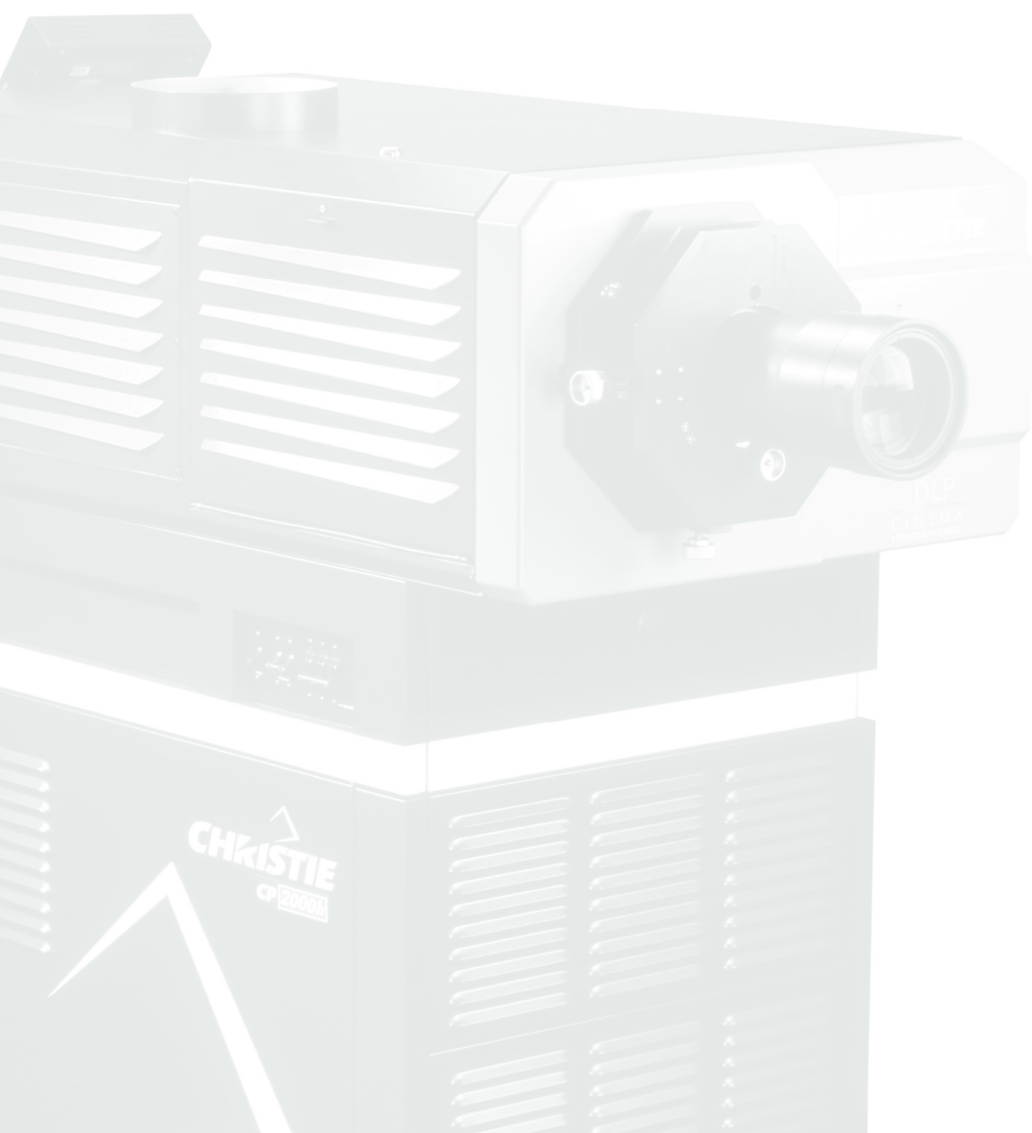


Digital Cinema in Ireland

A review of current possibilities



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The views expressed in this report are those of the author. Unless specifically attributed, they do not represent the views of the Cultural Cinema Consortium nor those of any persons or organisations who have been consulted in the course of the review.

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Executive summary

- 1 The term 'digital cinema' in this report refers to projection systems which can be used to screen new release and specialised films to public audiences at a standard comparable to or better than that achievable with conventional 35mm film.
- 2 After many years of hesitancy, digital cinema systems are now being installed and operated in rapidly increasing numbers throughout the world, especially in the USA but also in Europe and the UK. Most new release films are available for these systems.
- 3 The roll-out of digital cinema varies from country to country. Two competing concepts underpin the roll-outs: one based on market power and technological enforcement; the other on audience development and open access.
- 4 The standards developed by the seven major US film studios, known as DCI-compliant standards, have been generally accepted as the basis for mainstream cinema releases. Meeting these standards is a complex process and some interoperability problems between systems continue to be experienced by film distributors and exhibitors.
- 5 In the short to medium term many cinemas expect to retain their conventional 35mm systems to operate in parallel with the new digital systems. However there is increasing pressure, mainly from Hollywood's major studios, for *all* cinemas to be converted to digital projection.
- 6 The distribution costs for a digital release can be far less than those for a 35mm release. While the main benefits expected to accrue to the major studios are financial, smaller independent film distributors expect to be able to use their limited budgets to give wider releases for their films and thereby reach larger audiences.
- 7 The capital costs of the digital projection technology are reducing. The latest generation of equipment is approximately 25%–30% cheaper than previous models. The typical cost of installing a DCI standard projector plus server and ancillary equipment is currently in the region of €70,000 to €80,000. This price is falling as newer, lighter, easier to operate projectors come on the market.
- 8 Digital projectors which do not meet the high DCI standards can be used successfully in venues (and at festivals) where non-mainstream films are being shown. This can benefit specialist films such as documentaries and foreign language films.
- 9 Advertising content is lagging behind feature film releases in the transition to digital. However the screen advertising sector is fearful of a mixed "35mm film + digital" cinema sector which is considered non-viable for screen advertisers.

- 10 A small but increasing number of cinemas are operating as 100% digital venues. From the 90-seat single screen Kino in Kent to a new 10-screen Vue multiplex in Hull, cinemas are now sufficiently convinced that their business can prosper independently of 35mm film.
- 11 Digital projection and ancillary equipment opens up the possibility of screening a diverse range of alternative content, including cultural, sporting and business events.
- 12 Digital Cinema Ltd (Ireland) aims to convert most cinemas in Ireland during 2008. A group of perhaps 40 screens (mainly cultural or remote, independent cinemas) do not meet the criteria of DCL's business model and are not expected to be converted as part of this roll-out. Some cinemas in Ireland may chose not to participate in the DCL roll-out. Their reasons for not participating include concerns about one company dominating the sector.
- 13 Digital Cinema Ltd (Ireland), in common with Arts Alliance Media in UK and Europe, and Access Integrated Technologies in the USA, have adopted a 'virtual print fee' model to fund the digital roll-out. These fees are paid to the equipment suppliers or integrators by film distributors each time a digitally equipped cinema screens a digital film. Over several years, these fees recoup the capital costs of providing digital projection equipment.
- 14 In the UK, the Film Council-backed Digital Screen Network had been completed and now has 238 digital screens in operation. This scheme aims to develop audiences for specialised film and allows cinemas to use the digital equipment in a flexible manner.
- 15 A concern for cinemas already equipped with digital systems is the erratic supply of digital prints from film distributors. Some films are unavailable on a digital print and there are some logistical and technological issues which remain to be resolved. Nevertheless this situation is improving month-by-month.
- 16 High quality and up-to-date training for both technical and managerial staff is essential for the successful implementation of digital cinema.

Options for consideration

- 1 Regardless of whether Digital Cinema Ltd (Ireland) achieve their target of equipping 500 screens in Ireland with DCI standard digital projection systems, there will remain a group of cinemas including cultural cinemas, arts centres, and smaller, probably geographically remote venues which will not suit the DCL business model. The Arts Council and the Irish Film Board, through the Cultural Cinema Consortium, might consider developing methods of ensuring that these cinemas are not 'digitally abandoned' and potentially denied access to a range of films, especially specialist titles distributed by independent film distributors.
- 2 The infrastructure to support the supply, installation, training, service and operation of digital cinema is developing quickly in the US, in the UK and in parts of Europe. The DCL roll-out is intended to provide a similarly comprehensive infrastructure. It is not clear at this stage whether all the cinemas in Ireland are willing or able to participate in the scheme. Additionally there are concerns from distributors and exhibitors about a single company dominating the entire Irish cinema sector. It would therefore be appropriate to investigate the opportunities for partnerships with other suppliers including Arts Alliance Media and Bell Theatre Services (both active in the UK) and XDC (active in several European markets).
- 3 The Cultural Cinema Consortium might consider developing a support programme which encourages key providers of cultural cinema to keep apace with developments in this area.
- 4 To assist the digital distribution of Irish films, the Irish Film Board and the Arts Council might consider requiring producers and distributors who receive public funding to deliver an appropriately formatted digital master as an integral part of the funding contract.

1 Introduction

The term 'digital cinema' has become a widely used term but it embraces a wide range of different and incompatible technologies. In a similar manner to conventional film – which includes 70mm, 35mm in various screen shapes, 16mm and 8mm – digital cinema spans everything from very high end equipment suitable for large capital city venues all the way down to home cinema systems.

This report concentrates on systems which are primarily intended for mainstream and independent public cinemas screening new release films for general audiences. Alternative systems are considered in the report but are not the principal focus of the study.

Digital cinema is seen by some as the saviour of cinema and by others as an expensive, possibly damaging technology which will concentrate power in a small number of companies. Typical contrasting views of cinema exhibitors are illustrated below¹

The pessimist has fears and anxieties	The optimist expects more revenues and increasing business
<ul style="list-style-type: none">• What does the equipment cost?• Who is going to pay for it?• Will there be guarantees?• Less diversity in programming and type of cinema• Will we lose independence on programming?• Will my investment be safe for the long term in the face of changing technical standards?• Will I be able to survive in future or will I be crowded out of the market?	<ul style="list-style-type: none">• Costs will be reduced on film releases• Improvement of film delivery and more diversity• Modern image and higher ticket prices• Alternative content presented in high quality - new business• Increasing revenues from the advertising market through cost reduction and more flexibility• Reduction of administration costs through the use of a play-out centre / network operation centre

Two philosophies

Underpinning the various strategies for implementing digital cinema there are two fundamentally different philosophies. One approach is based on market power and involves contracts with major companies which generally pay little attention to the independent and cultural sectors of cinema. The other approach adopts a more political stance and aims to find a way that enables all participants, large or small, to benefit from the roll-out of digital cinema.

As outlined later in this report, the market power concept has been adopted by the US major studios and arguably also by Digital Cinema Ltd (Ireland). The political, solidarity concept underlies many of the European approaches including the UK Film Council's Digital Screen Network.

¹ The pessimist/optimist table is based on a presentation by RMC GmbH for Europa Cinemas conference, November 2006. Europa Cinemas are cinemas which commit to programming a defined percentage of European films in return for funding from the European Union through the Media programme. Europa Cinemas' objectives include supporting the transition to digital projection in cinemas.

This report examines the technologies, the business models, and the experience of distributors and exhibitors to date. The report is structured into the following sections:

- Chapter 2** The main technologies – an overview of the distribution, storage and projection technologies involved in digital cinema, making the transition to digital.
- Chapter 3** The current roll-out of digital cinema – Digital Cinema Ltd in Ireland, the UK Film Council Digital Screen Network, European experience.
- Chapter 4** Implementing digital cinema in Ireland – Distribution, training and roll-out issues and options for the Irish cinema sector.

2 Digital cinema

2.1 Digital standards and specifications

2.1.1 Digital Cinema Initiative

Digital films can be made in a bewildering range of incompatible formats. Film producers, film distributors, cinemas and domestic consumers all face choices between competing systems. Faced with potentially disruptive confusion, the seven major Hollywood studios², along with some smaller producers, established a working group called the Digital Cinema Initiative (DCI). This expert group aimed to produce an open architecture specification for the distribution of digital films which would ensure that cinemas would be able to screen their (Hollywood) films. Additionally the DCI specification aimed to implement systems which would protect their films and prevent piracy.

In July 2005 the DCI published 'Digital Cinema Specification v1.0' which the major studios intend to become the standard for distribution and exhibition of major, commercial Hollywood films – films which account for the majority of cinema attendances in many countries including much of Europe.³

The DCI specification, which runs to over 160 pages, does not provide a technical standard for the entire digital cinema system nor does it have any legal status (although it may be referred to in film booking contracts). About half of the DCI specification is concerned with anti-piracy measures.

The German Fraunhofer Institute, a large applied research organisation, was commissioned by DCI to produce a framework of standards which could be used to test digital cinema equipment in order to verify whether the equipment satisfies the requirements detailed by DCI. In October 2007 DCI issued their Compliance Test Plan v1.0 (474 pages) which covers all aspects of the digital cinema environment and delivery system.

In parallel with the DCI's work, the US Society of Motion Picture Technicians and Engineers (SMPTE) established a separate working group (DC28) in order to provide a complete set of standards for digital cinema distribution and exhibition.

2.1.2 Non-DCI alternatives

In the USA and anywhere where Hollywood studio releases are the commercial cornerstone of cinemagoing (including Ireland and the UK), the DCI specification is expected to dominate the implementation of digital cinema. There are alternatives which are already successful in other countries, notably in China, India and South America. In these territories the necessity of screening Hollywood films is considerably lower and cheaper, less secure digital systems are being implemented in large numbers. 1.3K projectors, such as the popular Panasonic 7000 series, are used in these countries

² Disney, Fox, MGM, Paramount, Sony Pictures Entertainment, Universal, and Warner Brothers.

³ *Digital Cinema Specification v1.2* was issued in March 2008. *The Stereoscopic Digital Cinema Addendum, Version 1.0* was issued in 2007

and have also been used in specialist cinema schemes such as CinemaNet Europe⁴ which aims to promote European documentary films, and by Emerging Pictures⁵, a USA company which uses museums, galleries, community centres and former picture palaces to screen specialist films. UFO Moviez, with over 1,000 digitally equipped screens in India, is another organisation operating non-DCI standard systems which they believe are excessively expensive and restrictive. (See 3.4)

2.1.3 Digital formats

Compression formats

Digital moving images require huge amounts of computer file storage. In order to distribute a digital film it is necessary to compress the images and reduce the file size. There are several ways of achieving this but the main approaches are systems known as MPEG2, MPEG4 and JPEG2000.

The format chosen during the first ten years of digital cinema (approximately 1995-2005) was MPEG2 which was felt to offer the most economical solution. In some countries such as Brazil, the MPEG4 format has been used by digital pioneer Rain Networks. However the DCI specification requires the JPEG2000 format which is felt to offer the best quality and that is what all the mainstream cinema equipment manufacturers are now concentrating on.

Digital films are stored on special servers such as the Doremi DCP-2000, Kodak CineServer MN2000, Dolby Show Player DSP100 or the DTS Filmstore which store and playback digital films⁶. The digital servers are the equivalent of 35mm film platters or towers.

Image resolution

Digital image quality depends on factors including colour quality, contrast and resolution. However digital cinema systems have, like still image cameras, been popularly classified according to their resolution rather than any of the other factors.

The DCI specification requires a '2K' resolution (2048 x 1080 pixels per image) while aiming for '4K' as the ultimate goal (4096 x 2160 pixels). The 2K systems are effectively an industry standard at present with over 6,000 systems installed from manufacturers such as Christie, Barco, Kinoton, NEC, Strong, and Cinemeccanica. There are less than one hundred 4K systems operating worldwide, all utilising Sony's CineAlta 4K projector although more manufacturers are expected to offer 4K systems in the relatively near future.

⁴ CinemaNet Europe was funded by 2 million Euros from the Media Programme. It operates in the UK, the Netherlands, Spain, Austria, Germany and France. Approximately 200 cinemas take part in the scheme.

⁵ Barry Rebo, CEO of Emerging Pictures refers to his approach to digital cinema as "I-Cinema" standing for International Cinema. Emerging Pictures operates in 5 full time and 10 part-time locations.

⁶ The storage of films and the playback (serving) may be separated into two physical units, for example the Dolby Show Store and its partner the Dolby Show Player. The separation allows the units to be placed in the most appropriate and secure locations within the cinema.

Confusingly the broadcast television sector also refer to the new High Definition (HD) systems as '2K' but in their sector this means 1920 x 1080 pixels – a small but important difference especially for cinemas which want to screen material which has been created primarily for television viewing, for example live broadcasts of opera, rock concerts, football or motor sport, or documentary films.

The earlier digital cinema systems, and a popular range of lower cost digital projectors, operate with 1.3K or 1.4K resolutions. While most audiences would find it difficult to tell the difference between a film screened using 1.3K projectors and 2K projectors, the DCI specification excludes the lower resolution equipment, effectively denying the possibility of a lower cost implementation of digital cinema in countries such as Ireland and the UK which rely heavily on US major studio releases. Nevertheless a number of cinemas, arts centres and other entertainment venues in Europe and the USA are using 1.3K 'non-DCI compliant' projectors for non-mainstream films and the HD alternative content described above.

2.2 Digital distribution

2.2.1 Digital mastering

Digital files

Digital films go through a number of stages before they are despatched to a cinema. Starting with either a scanned 35mm film or a digital original (digital negative) a digital intermediate process applies colour correction and graphics to produce a Digital Source Master. Further work is done to ensure that the files comply with the DCI specifications, resulting in a Digital Cinema Distribution master which is 'packaged' in a standardised format called Media Exchange Format (MXF). The MXF package can be compared to the wrapping around a box of chocolates – it describes what is inside and what the ingredients are. The MXF package tells the cinema equipment how to playback the various elements of the complete film – images, sounds, subtitles, etc.

Distribution methods

Currently DCI standard digital films are usually distributed using computer hard drives. This is considered to be relatively inexpensive, easy to produce and despatch, robust and simple to use in the cinema environment. Hard disks suitable for this method cost €120 to €150. Arts Alliance Media (who operate the UK Film Council's Digital Screen Network) charge approximately €30 delivery per disk despatched. All disks are returned to AAM after use.

Hard disk distribution should be relatively straightforward but in practice some film distributors have experienced problems and considerable additional costs. Small differences in equipment standards have meant that 10 or more versions of a hard disk digital copy have been required for a release.

Satellite distribution of DCI-standard cinema releases is considered to be too expensive and too slow to be practical for most film releases at present. Some companies estimate that once 1,000 or more cinemas are receiving a satellite download then the costs will become more favourable compared to hard disk delivery.

In Brazil and India digital cinema networks are operating using satellite downloads. This is possible because these cinemas are using a less technically demanding system similar to HD television broadcasts, systems which are not 'DCI compliant' and are therefore prohibited from being used to screen US studio commercial releases.

In the USA, Universal Pictures, Warner Brothers Entertainment and Digital Cinema Implementation Partners (a consortium representing 14,000 cinema screens in North America) are working on a system which combines satellite and broadband delivery.

Encryption and digital keys

Fundamental to the DCI approach is a military standard encryption scheme which is intended to prevent films from being used except in contractually agreed situations, that is, in a particular cinema on specified dates on identified and certified equipment.

When a digital cinema release is supplied to a cinema it cannot be played until the appropriate digital key (the 'key delivery message', KDM) is entered into the cinema server. Each KDM is supplied as a small computer text file separate from the digital film. Various methods have been used to deliver the KDM – email, USB memory sticks, and CDs have all been employed.

Each KDM is related to a particular film booking contract. If a cinema wants to extend or change its screening schedule for a film then it must obtain a new 'key' to allow the equipment to play the film. In practice the distribution of KDM keys has often proved more awkward than was initially envisaged but the evidence indicates that distributors and exhibitors are becoming more accustomed to the practice and are solving problems such as allowing cinemas to switch a film from one auditorium to another more suitable one

2.2.2 Digital film distribution costs

The cost of a typical 35mm film print is estimated to be around €1,500 but the cost of a computer hard disk with an encrypted digital copy of the same film costs €150. It is this saving, and the reduction in environmental damage caused by discarded 35mm film, that is driving the financial calculations behind digital cinema. (Security or anti-piracy measures are another powerful rationale for the US Studios.) Hamish McAlpine, Chairman of Tartan Films in London explained why digital distribution would benefit smaller independent distributors and specialised cinemas⁷. His calculation, based on early 2006 prices, detailed the cost for a digital distribution master with encoding, encryption and encoding of 5.1 surround sound at £2,037 per title hour x 1.75 (a film running 98 mins rounded up to nearest 15 mins) + £100 for encoding of certificate and distributor logo = £3,666.

⁷ Presentation by Hamish McAlpine at the UK Cinema Conference 2006 in London, 2 March 2006.

	8 copies on digital	8 copies subtitled 35mm	8 copies English language
Master & copies	Digital master £3,666 8 x digital copies @ £78 per copy	8 x £1,500/print	8 x £700/print
Total	£4,290	£12,000	£5,600
Saving with digital		£7,710	£1,310
		Breakeven at 3 prints	Breakeven at 6 prints

McAlpine went further and described how the digital financial model was influencing Tartan's distribution practices. Ingmar Bergman's film *Saraband* was released by Tartan in October 2005 on 6 digital prints. The box office amounted to £40,000 of which Tartan received £12,000. The P&A costs were £11,981 and so the film achieved break even (leaving aside overheads and the cost of the digital master which came originally from Svensk Film).

Tartan Films have embraced the new digital distribution world and were one of the first independent distributors to sign a deal with Arts Alliance Media (AAM) covering both theatrical digital cinema releases and home entertainment via video-on-demand and electronic sell-through. AAM provide distributors with digital cinema encoding, encryption, digital cinema prints and security keys. The deal with Tartan also included digital content storage, mobile and portable device streaming of all Tartan films and trailers.

In early 2007 a major US distributor gave a vivid illustration of the potential savings for a major commercial release in Ireland. They estimated that the release of a summer blockbuster would require 120 prints costing around €3,000 each (assuming 150 mins running time) giving a total print bill of approximately €360,000. In contrast a digital release would cost closer to €18,000 – a saving to the distributor of €342,000 which if shared among the 120 screens involved would provide a Virtual Print Fee payment of €2,850 (more than three times the figure being suggested for US cinemas by the Hollywood majors, see Section 2.5.1).

¹ The pessimist/optimist table is based on a presentation by RMC GmbH for Europa Cinemas conference, November 2006. Europa Cinemas are cinemas which commit to programming a defined percentage of European films in return for funding from the European Union through the Media programme. Europa Cinemas' objectives include supporting the transition to digital projection in cinemas.

2.3 Projection technology

2.3.1 Texas Instruments DLP

One technology currently dominates the digital cinema world – the DLP® micro-mirror device, an optical semiconductor invented in 1987 by Dr Larry Hornbeck of Texas Instruments

For cinemas, this is a 1.2 inch (or the recently announced 0.98 inch) microchip with a rectangular array of up to 2 million hinge-mounted microscopic mirrors each measuring less than one fifth the width of a human hair. When a DLP® chip is coordinated with a digital video or graphic signal, a light source, and a projection lens, its mirrors can reflect a digital image onto a screen. DLP-based systems for cinema use three micro-mirror devices (one each for red, green and blue light) and are available for cinema in 1.3K and 2K resolutions.

2.3.2 Sony SXR digital cinema

Sony has developed an alternative, 4K digital cinema projection system marketed as CineAlta 4K. The 4K projectors offer four times the resolution of the 2K DLP systems. The quantity of data required to drive these projectors is enormous and poses considerable operational, distribution and storage challenges. 4K systems can be considered to be comparable to 70mm film and to be most suitable for prestige, large screen cinema locations. To date these projectors have been installed in a small number of test sites, including one in Norway, one in the Odeon Leicester Square, and three in the Odeon Guildford. In summer 2007 Muvico Entertainment equipped all 18 screens in their new Chicago multiplex with CineAlta 4K projectors.

While it is accepted that most audiences will not normally perceive a quality difference between 2K and 4K systems for many films, if a CinemaScope format picture is projected or the audience is close to the screen, Sony claim that there is an easily perceptible improvement in quality with their 4K projectors.

2.4 Digital projectors

2.4.1 DCI-standard cinema projectors

There are over 6,000 'Hollywood-quality' DCI standard 2K or 4K digital cinema systems in operations throughout the world, mostly in the USA. By the end of 2010 there are expected to be at least 20,000 'D-screens' in the US and Canada – almost two-thirds of the total screens in the North American territory. Texas Instruments believes that "the majority of the world's screens will be digital within five years"⁸. Europe is converting to D-cinema at a slower pace but already has over 700 D-screens, almost half of which are in the UK.

⁸ Cited in the Los Angeles Times, 9/4/07 "Showing at theatres: urgency of digital shift"

Christie CP2000 projectors are the most commonly installed units in the USA and the UK while Barco projectors (including variants sold by Kinoton and Cinemeccanica) are more common in mainland Europe. Specially designed Xenon lamps with ratings from 1.25Kw up to 10Kw are used and most models require similar, or improved, forced air ventilation to that used by 35mm cinema projectors.

DCI standard projectors typically cost €65,000 to €100,000 plus extra for lenses. Additional equipment (€45,000 to €60,000 for servers, multimedia boxes, cabling, etc.) is usually required to complete a typical DCI digital cinema installation.

D-cinema projectors usually operate with the same digital cinema sound systems which 35mm systems use, for example Dolby Digital or DTS (Digital Theatre Sound). Older sound systems generally require upgrading.⁹

During 2007, several manufacturers announced new lower cost, smaller and easier to operate D-cinema projectors such as the Christie CP-2000ZX and the Barco DP1500/2000.

Christie's CP2000-ZX is described as an all-in-one "compact and cost-effective digital cinema projector" designed for small to mid-sized screens. It is suitable for screens up to 45ft (14 metres) in width. Unlike its larger stablemate, the popular CP2000, the new projector requires single-phase power making it more suitable for a wider range of venues.¹⁰



Christie CP2 000-ZX



Barco CP1500

The Barco CP1500 and its more powerful companion the CP2000 are similarly compact and versatile projectors. They use the new smaller 0.98 inch DLP micro-mirror chips and are designed to be exceptionally easy to operate. The CP1500, with 3Kw xenon lamp, is suitable for screens up to 49ft (15 metres) wide while the CP2000 can work with screens as large as 65ft (20 metres) wide.

These new generation projectors are powerful enough to suit the majority of cinemas in Ireland apart from the small number of very large screens, mainly located in Dublin.

⁹ Digital cinema consultant and Chairman of the European Digital Cinema Forum David Monk pointed out at the Digital Cinema 2007 Conference that in tests the audience's perception of picture quality was influenced more by the quality of the sound system than by the resolution of the digital cinema projector!

¹⁰ At the cinema trade conference and exhibition ShoWest in Las Vegas, March 2008, Christie announced the CP2000-M digital projector. Like the Barco CP1500/CP2000 series, the new Christie projector is based on the smaller 0.98 inch DLP micro-mirror chip. The CP2000-M is suitable for screens up to 10 metres wide and weighs just 96 pounds / 44 kgs.

Quotations from two UK suppliers in summer 2007 for D-cinema equipment show the following prices¹¹:

Item	Supplier 1		Supplier 2	
	£	€	£	€
Barco DP1500 + lens + 3Kw lamp + pedestal	38,905	55,790	37,291	53,475
<i>Digital film store and server options:</i>				
1 Dolby Digital Cinema System	12,410	17,796		
2 Doremi DCP2000	12,095	17,344	9,900	14,197

When used with a multimedia unit, for example the Barco ACS2048 costing approximately €4,000, the projectors to be used with a wide range of video inputs including HD video, DVD, live satellite broadcasts, and DV Cam.

2.4.2 Other digital cinema projectors

Smaller and simpler projectors such as the popular Panasonic 7000 series use similar technologies to the D-cinema devices described above but at a lower resolution, for example '1.3K' (1280 x 1024 pixels). The lower resolution is not noticeably inferior in auditoria seating up to 150-200 people. The Panasonic PT-D7700 projector is much smaller than the DCI standard 2K projectors and weighs just 22Kg, measures 530mm x 560mm x 200mm, uses a dual 300w xenon lamp system, and costs around €18,500.

Projectors such as the Panasonic 7000 series can be ceiling mounted and have quiet fans (although efforts to contain this noise should still be made). A simpler and less secure media server, often based on the MPEG4 format, can be used as can DVD and other professional and domestic video formats. A standard cinema sound system is again normally required.

Because these projectors do not work with the high security DCI specification servers with their powerful encryption systems, these projectors cannot be used to screen new release mainstream (predominantly English language) films. In the USA, digital cinema circuit Emerging Pictures have screened a range of arthouse and specialist films using this standard of equipment. Similarly, Rain Networks in Brazil and UFO Moviez in India have established cinema networks based on 1.3K projectors.

2.4.3 Data projectors

There are many different types of video data projector, some using LCDs others using single or even triple DLP micro-mirror devices. These projectors are smaller and cheaper than any of the cinema-oriented projectors and have been used for many years in business meetings, conferences and increasingly in domestic homes and in film clubs. Some of these projectors are specifically designed for film-screening use while others are targeted at business data users. None of these projectors can be used to screen commercial release cinema films.

¹¹ Based on actual quotations from two of the leading UK cinema equipment installers for a new cinema and arts centre in North Wales which is currently under construction.

2.5 Who pays for D-cinema equipment?

A digital projector with ancillaries costs 2-4 times as much as a comparable 35mm projector and is not expected to have the long lifespan of traditional film projectors. The high costs, short life span, maintenance uncertainties, and need for specialist service are all concerns for cinema owners. As one US cinema operator pointedly said recently, "I'm still using film projectors that were built in the 1950s and I can fix them myself. What if your digital server goes down? Dark screens are death to the theatre industry"¹².

The long-term financial beneficiaries of digital cinema are predominantly the film studios and film distributors who will have greatly reduced costs as illustrated above (section 2.2.2). While there is a consensus that the costs of equipping cinemas with the new projectors should be shared with the studios and distributors, there is little agreement about how this should be achieved.

A variety of models have been proposed to finance the implementation of D-cinema including:

- Virtual print fees
- Flexible print fees
- Special leasing arrangements
- Government subsidies

2.5.1 Virtual Print Fees

The Virtual Print Fee (VPF) business model is based on film distributors compensating cinema owners for the cost of installing digital projection equipment. Each time a cinema books a film for a digital screening, the cinema receives a payment. At the European Digital Cinema Conference in London, September 2006, Julian Levin¹³ outlined the system as follows:

"If it costs \$80,000 to install a digital system on one cinema screen and 14 films are booked each year on that screen, assuming a \$900 VPF for each of the 14 films, the screen will pull in \$12,600 per screen rising to \$15,100 factoring in an annual exhibitor fee. It will take approximately five years to pay off the \$80,000 system, excluding capital costs, possible installation costs and ongoing maintenance."

The approach Levin outlined included an expectation that the cinema exhibitor would contribute an amount roughly equivalent to 15% of the studios' contribution and a similar contribution from playing alternative content. (See 2.9 below)

The business model proposed by Digital Cinema Ltd, Ireland, is also based on a VPF approach although the financial arrangements with film distributors are commercially confidential.

¹² Bill Campbell, owner of independent cinemas in Wyoming and Montana cited in the Los Angeles Times, 9/4/07

¹³ Julian Levin is executive vice president of digital exhibition and non-theatrical sales and distribution at Fox Entertainment.

The US Studios believe that due to the fragmented nature of the European cinema distribution market the VPF model may prove unsuitable in Europe and that if a scheme is agreed it will certainly be at a lower level of payments than is the case in the US. In order to work in Europe with a wide range of films the many distributors active in the region would have to agree to pay a VPF alongside the US studios, something that many in Europe regarded as unlikely – until an announcement in June 2007 by Arts Alliance Media.

Arts Alliance Media VPF proposals

Arts Alliance Media (AAM) has achieved a position of dominance in the UK due to being awarded the contract to supply, install and service the 238 digital cinema installations funded by the UK Lottery through the UK Film Council. At Cinema Expo 2007 in Amsterdam they announced that they had reached agreement with two major distributors (Universal Pictures International and Twentieth Century Fox) and were seeking the participation of more companies to fund a VPF deal for up to 7,000 screens in Europe¹⁴. There would be an allocation per country and it is believed that the UK and Ireland would account for up to 1,500 digital screens.

The proposed contract offered by AAM runs for 10-years but may be concluded earlier if distributor payments (VPFs) pay off the capital investment more quickly. Arts Alliance provide a full support package as part of the deal – from training, maintenance and equipment upgrades through to supply of properly encoded films.

Arts Alliance stresses that its role as an integrator allows it to offer economies of scale and takes the pressure off individual exhibitors. A brief brochure explaining the principal aspects of Arts Alliance's proposals is attached as Appendix 2.

Problems with the VPF model

The VPF model is apparently functioning well in the US¹⁵ but there are significant concerns about this funding approach including:

- The VPF is a transitional model and there is a lack of agreement about when the payments will stop. It is clear however that VPF payments *will* be 'turned off' once the majority of high-earning first-run cinemas have been converted to digital, in which case cinemas – inevitably the smaller venues – risk being left unmodified and potentially without a supply of films.
- There is no agreement about how smaller, independent distributors such as Eclipse should be treated. Some VPF-based contracts state that if a VPF isn't paid then that distributor's films cannot be played on the digital equipment.
- There are concerns that cultural diversity may decline and local cinemas may be forced out of business as a result of the imposition of the VPF model which is predominantly financed by the Hollywood major studios

¹⁴ In October 2007 Paramount joined the Arts Alliance VPF scheme, followed in December 2007 by Sony and in February 2008 by BVI Disney.

¹⁵ In November 2007 Access Integrated Technologies announced that a further 10,000 cinema screens in the US and Canada would be converted over the next 3 years under its second phase of VPF roll-out. Phase one included 3,750 screens.

- The value of the VPF is already declining and, coupled with decreasing prices for digital projectors, its role in financing the digital roll-out may gradually become less relevant to cinemas.¹⁶
- Screen advertisers would benefit from widespread implementation of digital cinema and the US studios have suggested that the advertising contractors should therefore also pay a VPF – but this proposal has not been accepted and is considered difficult to implement.

In order to address the difficulties posed by the VPF, there is a significant body of opinion that government intervention would be the most practical way to implement a digital roll-out in Europe. For example in Norway a combination of private and state funding is being proposed to convert all Norwegian cinemas to digital projection by 2010. In Germany almost 75% of cinema venues may not be suitable candidates for VPF arrangements, but there is agreement that it would be politically, socially and culturally unacceptable to leave these smaller cinemas without digital equipment.

2.6 Advertising content

Currently Pearl & Dean and Carlton Screen Advertising do not make regular advertising content available in DCI-standard 2K versions. The relatively small number of screens, and crucially the fact that almost all the cinemas continue to operate with 35mm film systems, mean that there is little incentive for the two companies to supply digital screen advertising content. As an interim measure, Pearl & Dean will supply advertising content on DVD if required, however this is a once-a-month service compared to the usual once-a-week service and the DVD service delivers a lower income to the cinema compared to the 35mm service. Nevertheless it is known that at least one of the two advertising suppliers will start offering 2K screen advertising during 2008.

The two screen advertising companies are concerned that a mixed economy with some 35mm cinemas and some digital cinemas will be uneconomic to support and may lead to the screen advertising sector collapsing entirely¹⁷. Consequently they are anxious to see a largescale and rapid changeover to digital. The two companies are also under pressure from the major advertisers to make the transition to digital, although the clients are reputedly unwilling to pay more to get their adverts on cinema screens.

2.7 Making the transition from 35mm to digital

One of the significant problems encountered by early adopters of digital cinema has been the difficulty of programming and scheduling a single digital screen. Multi-screen cinemas must decide whether they convert one or several of their screens. Brendan McCaul, BVI Ireland, explained the problems experienced by both distributors and exhibitors during this early phase of the digital transition. McCaul pointed out that with only a single DCI projector per cinema venue, there are inevitable problems:

¹⁶ The New York Times (13/3/08) has reported that the VPF fee offered for the second phase roll-out in the USA and Canada will be \$800 per film compared to \$1,000 per film during the initial phase.

¹⁷ A view expressed by Nicolette Homes, Commercial Director at Carlton Screen Advertising at the Digital Cinema 2007 Conference in London, September 2007

- When several distributors have a new release available as a digital print in the same week there is competition to get access to the single projector in the venue.
- There are regular mismatches between the type of film being released and the seating capacity of the auditorium with the digital projector (for example a minority interest film in the largest auditorium or vice versa).
- If a film opens in the digitally equipped auditorium but then in subsequent weeks has to be moved to another, usually smaller capacity, auditorium then a 35mm will often be required.

In McCaul's opinion at least 50% of the screens in an individual cinema need to be converted to digital in order to at least partially solve these problems.

Arthouse cinemas, arts centres, mobile cinemas, and small independent cinemas may face substantial financial obstacles when trying to introduce DCI standard digital systems. They may also face technical installation problems due to their often less spacious projection rooms. The UK Film Council reported that the average cost of adapting projection rooms/booths for digital during the Digital Screen network rollout was £5,000 (€7,150) per screen.

2.8 Operating a 100% digital cinema

2.8.1 New independent digital cinemas

Creating a fully digital cinema overcomes the problems of having to book both a 35mm and a digital copy and of converting projection rooms, but more fundamentally a new-build fully digital cinema opens up the possibility of substantially different ways of programming and operating. In the UK, the Kino Cinema in rural Kent was built with 100% digital cinema technology in mind and has pioneered radically different ways of operating.

This 90-seat single screen cinema shows 5-6 *different* feature films every day. The repertoire-style programming has meant that the cinema can offer around 20 titles per month, far more than a conventional single screen cinema could cope with.

Additionally, the entire operation is based around a central computer scheduling system which drives café bar sales, ticket sales, the cinema web site and booking system, and the operation of the projector – the entire venue is run by two staff who work in the café bar. No one is in the projection room.

What the Kino has demonstrated over the past two years is that it is possible to be a fully digital single-screen cinema, albeit one which relies mainly on specialised films supplied through the UK Film Council digital screen network scheme. It has also demonstrated that a high quality venue can attract substantial new audiences in rural areas (35,000 in its first year of operation) and create a successful business.

2.8.2 Digital multiplexes

In the mainstream arena, Odeon has equipped all the screens in two of its multiplexes near London with digital projectors. The 9-screen Odeon Hatfield has been equipped with NEC projectors and Kodak servers and digital management equipment by Bell Theatre Services.

The 9-screen Odeon Surrey Quays has been equipped with Cinemeccanica projectors (based on the Barco model) and Doremi servers provided and serviced by Arts Alliance Media who have installed the UK Film Council 240-screen network. The Odeon trial is backed by distributors including LionsGate UK, Pathe Distribution, Universal, 20th Century Fox, and Sony. Odeon has a further 30 screens equipped under the Film Council scheme although in most instances each multiplex site has just a single digital projector.

Ward Anderson sister company Empire Cinemas has converted its High Wycombe 6-screen multiplex to fully digital operation. The two Odeons and the Empire multiplex continue to operate with some 35mm film. More radically, the 10-screen Vue multiplex in Hull which opened in December 2007, is purely digital.

In Belgium, Kinopolis is converting its entire chain of multiplexes to digital projection and in Chicago the Muvico 18-screen multiplex operates entirely with Sony CineAlta 4K projectors. In the Far East an increasing number of multiplexes also operate entirely with digital equipment.

2.9 Alternative uses for digital cinemas

A potential benefit for digital cinemas which is just beginning to be properly exploited is the ability to screen a wide variety of non-cinema material in the cinema auditorium. From live relays of New York's Metropolitan Opera (City Screen), Glynebourn Opera (Odeon) or a David Bowie concert, to business conferences, to screenings of locally produced films, to interactive computer gaming, to organisational training sessions and video conferencing, the digitally equipped cinema can be a suitable venue.

Within the cinema sector, digital cinema can enhance screenings by including live question and answer sessions with the director or screenwriter (as CinemaNet Europe demonstrated regularly during 2006-07), or can relay film festival events to audiences in rural or distant communities.

Opening up the cinema venue to a broader range of uses, as well as making use of the screen time more intensively, means that the business model can change and the cinema can be more of a social, entertainment and community resource. Muvico Entertainment's 18-screen digital multiplex in Chicago¹⁸ has the motto "Come for the food; stay for the movie" in recognition of the high quality food and entertainment options their venue offers.

¹⁸ <https://www.muvico.com/default.asp?t=210>

While some cinemas relish the thought of a new income stream and a break from the perceived stranglehold that film distributors have over their businesses, it is important to recognise that alternative content will normally be supplied at a price and in some instances, for example live broadcasts from Sky Sports, the price has been too high to attract some cinemas.

Trials of rock concerts, opera, sporting events and even stand-up comedy have proved successful at various venues in the UK and are being heavily promoted in the US. However the major circuits don't believe that 'alternative content' will account for more than 1%-3% of box office revenue (although this could be substantially different for independent venues, especially arts centres or mixed use venues). Additionally the early trials have proved to be resource intensive, demanding a considerable commitment from technical and marketing staff.

2.9.1 Opera in digital cinemas

New York Metropolitan Opera in City Screen/Picturehouse cinemas

The Met has a long history of live radio broadcasts and in 2006 began High Definition live broadcasts via satellite of matinee performances to cinemas in the US, Canada, UK, Norway and Japan. According to the Met's press releases 48 out of 60 US cinemas sold out their performances while all seven of the UK venues sold out. A second season of concerts started in January 2008.

Tickets in the US cost around \$18 adult, \$15 child. In the UK a much higher ticket price has been charged by City Screen £25 adult (€37) and £20 concession (€30) but the performances have continued to sell out. The UK screenings have usually been presented using the Film Council digital screen network equipment supplemented by satellite reception facilities.

Glyndebourne Opera in Odeon multiplexes

A similar scheme was tested in the UK in Autumn 2007 at ten Odeon multiplexes. Productions including *Tristan and Isolde* and *Così fan tutte* were be screened, although these were not 'live' relays of performances. Tickets were competitively priced at £7.50 (€11).

3 Current roll-out

3.1 Digital Cinema Ltd (Ireland)

Digital Cinema Ltd (DCL) is an independent Irish company owned by four shareholders, each with a 25% shareholding. Digital Theatre Systems, Inc (DTS) – a worldwide supplier of digital sound systems for cinemas and home cinema systems – recently acquired the 25% stake in DCL previously held by Avica Corporation. The involvement of DTS has provided DCL with direct access to the major companies in the cinema business. Two of the other shareholders have connections with the Irish cinema sector.

3.1.1 Proposed roll-out

In 2005 DCL announced that it would launch a scheme to provide digital cinema equipment to all cinema screens in Ireland. By early 2008 they had installed 33 systems in 13 sites. Movies@Dundrum has 10 digital projectors but most of the other sites have 2 units.

CEO Ian Kirby stated during the consultations for this study that 120 screens in Ireland had already made projection room porthole and cabling modifications in anticipation of digital projectors being installed. The next phase of DCL's roll-out is to equip these 120 screens. Following directly on from this the remaining 300+ screens are planned to be equipped within 2 years. The full network is planned to be in place and operational by 2009. However there was scepticism among those consulted within the Irish cinema sector about the ability of DCL – or indeed any one company – to achieve the rollout objective so quickly.

Duration of the project

All the projectors, servers and associated equipment installed by DCL as part of the contract remain the property of DCL. Effectively it is a rental arrangement (but not a lease agreement) which is paid for partly by the VPF from distributors and partly by cinemas through maintenance and service charges.

The agreement runs for a minimum of 5 years but not exceeding 10 years. After the initial 5 year period the agreement may be terminated without penalty subject to 12 months notice of termination by either party. If the exhibitor terminates the agreement it will "be required to pay the balance of the equipment value written down over 7 years"¹⁹. This suggests that the expected life of the contract is 7 years but no details are provided about what happens to the equipment after that period.

Business model

DCL's business model is based around a virtual print fee payable by film distributors and screen advertising companies²⁰. According to Kirby, the business model makes sense once the purchase price of the projectors and servers falls below €50,000. This

¹⁹ DCL's contract section 17 details the written down values after each year.

²⁰ DCL have been in discussion with Carlton Screen Advertising who provide screen advertising to the majority of cinemas in Ireland. No details are available of the financial and operational proposals being discussed by the two parties.

price level has yet to be achieved but the recently introduced Christie CP2000-ZX and Barco CP1500 make the target more achievable. DCL anticipate being able to negotiate a substantial discount on the purchase price of projectors in respect of their bulk purchase.

DCL's model assumes that in the short to medium term most cinemas will continue to operate 35mm systems alongside the new digital systems²¹. During the period of dual operation the cinema will therefore not be paying DCL the maximum VPF per year. Although Kirby is confident that DCL has adequate funding in place, a gradual introduction of digital distribution may place a strain on the cashflow of DCL.

Excluded cinemas

DCL have identified approximately 40 cinema screens where they do not believe the VPF model will work and therefore these venues will not be offered projectors under the DCL roll-out. These are believed to be smaller and more specialised cinemas but may also include the IFI, Lighthouse, Solas in Galway, and Kino in Cork. DCL are willing to discuss an alternative arrangement for these venues which might, for example, allow the non-DCL venues to purchase digital projectors at the discounted price DCL obtains for its main rollout. Additionally, non-DCL venues may be able to contract DCL to provide training and support services for digital projectors purchased from DCL.

Monopoly supplier concerns

DCL's ambition is to be the sole supplier of digital projection equipment to cinemas in Ireland. The company argues that this is not a monopoly situation because the Irish cinema market is a small portion of the global market. It does however represent a monopoly from the perspective of cinema owners and local (Irish & UK) film distributors who must deal with only one company. This monopoly position is something which some UK and Irish distributors are concerned about although at present they are continuing to work with DCL.

A further concern was expressed by one cinema owner who stated that he was reluctant to participate in a project where two shareholders, representing 50% of DCL shareholding, could be competitor companies in Ireland. This view may be taken by other cinema owners but there is no direct evidence at present to suggest that this is happening.

DCL's contract specifies that the cinema agrees *"not to accept or take any digital cinema operating systems or services or digital motion picture or advertising distribution network services from any third party, whether on a commercial basis or otherwise."* Although this clause is specified in order to protect the commercial viability of DCL's business, it is arguably over-restrictive given the relatively early days of digital cinema roll-out. It places a participating cinema entirely in the hands of DCL's technical team to provide maintenance and service throughout the agreement period – potentially damaging other cinema service contractors who are 'locked out' from developing digital cinema expertise.

²¹ DCL's contract Section E (v) requires the cinema to continue to maintain its 35mm film projection facilities, unless specifically agreed otherwise.

VPF competitors

In June 2007 Arts Alliance Media announced plans for a 7,000 screen VPF-based rollout in Europe, including screens in the UK and Ireland²². Additionally Access Integrated Technologies, the major VPF integrator in the US, is known to be preparing plans to enter the European market and may also target some Irish cinemas.

Supply of films and other content

The DCL agreement with cinemas depends on the company being able to obtain digital cinema content from film distributors. The Contract between DCL and cinemas states:

"The Company [DCL] acknowledges that this Agreement is conditional upon the Company being in receipt of agreements from distributors, upon commercial and other terms to the reasonable satisfaction of the Company, to supply digital cinema content to the Company from three of the following six studios: Universal, Disney, Warner, Paramount, Fox and Sony."

If DCL fails to obtain appropriate agreements from at least three distributors the contract with the cinema is void. The issue at stake here is agreement between DCL and film distributors regarding the virtual print fee.

Control of systems and information

A contentious issue for members of the National Association of Theater Owners (NATO), the trade organisation for commercial cinemas in the USA, is the potential interference of film distributors in the "normal practice" of cinema exhibition. Specifically they reject any mechanisms linked to monitoring and logging the use of the digital projectors which may restrict the way the cinema organises its screening schedule or which transfers confidential information back to a network headquarters.²³

The DCL contract summary refers to *"automated logging and billing features [which] will further simplify theatre management"*²⁴. The Exhibitor's Covenants section of the DCL contract states *"The Exhibitor will not interfere with the Logs or with the dispatch of the Logs or other duly authorised data relating to the system and System Related Activities"*. These statements indicate that DCL could potentially be in a position to intercept data in exactly the manner that the NATO members are concerned about. This apparently arcane issue underpins the debate about who controls film screenings – the cinema or the film distributor – and becomes particularly sensitive if a cinema participating in the DCL scheme believes, rightly or wrongly, that one or more of the DCL shareholders is a competitor.

²² The Arts Alliance Media VPF package is only available to cinemas converting from 35mm film projection. New build cinemas starting out with digital cinema systems cannot be financed through this particular VPF arrangement.

²³ NATO's response to the publication of the DCI specifications on 27 July 2005 draws attention to their stance on system logs. NATO states that "we have insisted throughout the work of SMPTE and DCI that any data created in the [projection] booth should belong to the exhibitor. Such log proprietorship is particularly important because security logs can be used to reconstruct business data, such as movie start times."

²⁴ DCL contract Section 8.1 states: "The Exhibitor acknowledges that the System is capable of an intended to be utilised for the purposes of the despatch of Logs and other System Related Activities." The contract goes on to specify confidentiality and Data Protection requirements which are intended to satisfy cinemas' concerns about data being passed on to film distributors or other parties.

Alternative content

DCL's contract acknowledges that cinemas may want to screen alternative content on the digital systems installed by DCL²⁵. The contract specifies that cinemas would pay DCL an hourly hire charge for alternative content screen time. If an engineer was required to set up the screening then additional charges would be made. For example if an engineer was required to travel 50 kilometres from Thurles, the operational base, and spend 4 hours onsite at the cinema, a charge for travel time, subsistence and on-site engineer fees would be payable. Together with perhaps 2-3 hours of screen time hire charges, the cinema could be liable to pay DCL €900 for the single screening plus whatever content rental/hire charges were levied.²⁶

The DCL arrangement is in contrast to the contract that is in place with the UK Film Council Digital Screen Network cinemas where the cinemas can use the projectors for whatever type of material that they wish to screen, all for no extra charge.

3.2 UK Film Council: Digital Screen Network

In August 2004 the UK Film Council announced that it was spending £11.7m (€15.5m) of its National Lottery funding to install digital film projectors and related equipment in cinemas across England, Scotland, Wales and Northern Ireland to create Europe's first 'Digital Screen Network' (DSN). In May 2005 it was announced that 238 screens (in 209 cinemas) would receive systems. The value of the equipment provided to each cinema is approximately €80,000 (ex VAT).

The UK Film Council views this as an audience development initiative with the specific intention of increasing attendances for specialised films. They estimated that once the network was fully functional there would be an increase of 4 million attendances to specialized film (compared to 10 million in the UK before the DSN). The scheme is described as follows:

*"The Digital Screen Network (DSN) is envisioned to be a key part of the UK Film Council's strategy for broadening the range of films available to audiences throughout the UK and especially improving access to specialised (or non-mainstream) film. The Digital Screen Network will strategically operate in conjunction with other UK Film Council Distribution and Exhibition initiatives, such as the Print and Advertising Fund for specialised films and the Audience Development Scheme [recently launched as the film recommendation web site www.myfilms.com]. Furthermore, the Digital Screen Network strategy will be realised in partnership with relevant organisations and institutions such as the BFI, Creative Partnerships, the Regional Screen Agencies, Scottish Screen, Ffilm Wales, Northern Ireland Film & Television Commission, the British Federation of Film Societies, etc."*²⁷

Over half the DSN screens are in multiplex cinemas. Cineworld received 70 units, Odeon 56 units, and Vue 36 units. Smaller circuits, independent commercial cinemas

²⁵ DCL contract Section 2 specifies that the equipment is to be used "solely for the purpose of screening: motion pictures and trailers; advertising; alternative content; live content; educational or informational content; interactivity or interconnectivity content – which DCL supplies or authorises in writing"

²⁶ DCL contract Section E(x) specifies "No additional piece of playing or other equipment may be attached or connected to the Equipment [the digital projector and server]..." This clause prevents unauthorised and charged addition of, for example, a multi-media box and DVD player to the server and projector in order to play alternative content.

²⁷ See www.ukfilmcouncil.org.uk/cinemagoing/distributionandexhibition/dsn/

and specialised cinemas including the National Film Theatre in London and Queen's Film Theatre in Belfast were also awarded projectors.

Exhibitor commitment

Cinemas wishing to participate in the Digital Screen Network were required to apply to the UK Film Council demonstrating how the provision of a DCI standard digital projection system would allow the cinema to increase the number and range of specialised films it would screen. All applications for Lottery funded projects, including the DSN, are required to show that they will result in *additional* public benefits and in this instance developing audiences for specialised film is the identified benefit.

In practice participating cinemas were invited to specify the additional level of specialised programming that they would offer and how they would support that with marketing activity.

DSN cinemas are contractually required to screen a minimum of one specialised film per month on a mid-week early evening slot. Qualifying specialised films are listed on the Film Council web site. Additionally cinemas may be asked to participate in a special week-long festival and allocate seven screening slots to these films.

All participating cinemas are required to provide a monthly 'programming report' to the Film Council with details of all the specialised films they have screened. Importantly, specialised films screened using conventional 35mm equipment count towards the programming commitment.

Implementation

In order to deliver roll-out of the projectors, servers, and associated services including training and service back up the Film Council contracted with a consortium headed by Arts Alliance Media (Digital) Ltd, based in London. A framework agreement between the Film Council and AAM set out the aims of the project and the mechanism whereby the Film Council could use Lottery funds to pay AAM for the equipment it installed in the cinemas. Although cinemas gain entry to the DSN through an application to the Film Council, the implementation of the scheme is through a contract between AAM and individual cinemas.

AAM established a technical headquarters in London and provide a full range of installation, training, maintenance and back-up services for the cinemas in the DSN. In most instances a single projector was awarded to each cinema site, normally a Christie CP2000 but in some situations the smaller NEC iS8. Initially QuVis servers were installed but these have now been upgraded to Doremi DCP2000 servers which meet the latest DCI specifications. A multi-media switcher unit is included in the package and allows cinemas to play a range of non-DCI content through the system, for example DVDs, computer presentations, interactive gaming, or live satellite broadcasts/narrowcasts.

An annual usage charge of €4,500 (increasing annually to €5,900) is levied by AAM on each cinema. Each digital print delivered to the cinema is subject to a €30 delivery charge.

Duration of the project

The DSN project is designed to run for 4 years from the moment that the full network is operational (April 2007). At the end of this period AAM will offer the cinema the opportunity to purchase the digital projector, server and multi-media box outright at the lower of a final value (set at approximately €15,000) or the fair market value of the equipment.

Unintended outcomes

Each cinema was allowed to specify the auditorium where the DSN projector would be installed. In many instances cinemas, including multiplexes, chose one of their larger auditoria – suitable for major blockbuster releases but not generally appropriate for specialised films, the supposed main beneficiary of the DSN scheme.

As a result of these individual decisions by cinemas, it is the mainstream blockbuster which is now more likely to be exhibited in the UK in digital format.

At the same time, smaller independent distributors wanting to benefit from digital cinema releasing are being frustrated at not being able to get their films into a small(er) auditorium because these are not the auditoria with the D-cinema equipment.

The UK Film Council argues that provided the cinemas fulfil their agreement to screen specialised films, then it does not matter what films the cinema screens with the DSN projectors. Clearly however it does matter for the independent distribution sector.

Comparison between DCL and UKFC DSN

Digital Cinema Ltd (Ireland)	UK Film Council: Digital Screen Network
Intended for screening of DCI standard content – new releases, Hollywood, etc	Intended for screening of DCI standard content – focus is specialised film
Alternative content permitted but charged extra per hour plus engineer costs	Alternative content encouraged. Multi-media box supplied as standard. No extra charges.
Minimum 5 years contract, 10 years maximum. Termination before end of Year 7 requires a proportionate repayment of equipment value. No end of period purchase option	4 year contract with option to purchase equipment at the end of the period
Based on a virtual print fee from the major film distributors. Smaller distributors, e.g. Eclipse, being asked to pay similar VPF	No virtual print fee. Smaller, independent distributors can access the DSN on the same terms as major distributors.
Primarily a technology implementation scheme	Primarily an audience development scheme

3.3 European digital cinema

A number of European digital cinema projects have emerged including CinemaNet Europe which promotes European documentary films, the Swedish Folkhets Hus och Parker network based on community venues, Arts Alliance Media's new partnership in Norway (Nordic Digital Alliance), and the individual circuit initiatives such as Belgium's Kinopolis which has announced that all its cinemas will be converted to digital. In November 2007, DCinema Today reported that Circuit George Raymond ("CGR Cinémas"), one of France's largest cinema chains, and Arts Alliance Media had reached an exclusive agreement for the deployment of digital cinema in 100% of the circuit's 400 screens. The rollout is expected to take place during 2008 and 2009.

In the following section two further approaches to financing the digital cinema roll-out across Europe are outlined.

3.3.1 Leasing

A significant alternative to the VPF approach is leasing. While many commercial leasing companies may be willing to provide traditional lease finance the terms are unlikely to be different from those obtained for any other capital equipment. The Royal Bank of Scotland have confirmed that they will be offering a finance package, presumably on favourable terms, to aid the implementation of digital cinema and hope to announce details during 2008.

Two companies have however assembled lease finance packages specifically for digital cinema equipment and services. XDC has been operating in central Europe for several years and is now a leading supplier and integrator for cinemas and film festivals in Europe. Arts Alliance Media are preparing a similar scheme which will run alongside their VPF initiative.

XDC

XDC, formerly EVS Digital Cinema, is the major implementer of digital cinema solutions across Europe with offices in Liège, Berlin, Madrid, Paris and Stockholm. The company claims to have installed 80% of all the digital cinema systems in Europe, over 350 screens in Sweden, Belgium, Luxembourg, France, Spain, Switzerland, Germany, Austria, The Netherlands and Poland.

Country	XDC digital screens	Country	XDC digital screens
Austria	18	The Netherlands	21
Belgium	44	Spain	16
France	27	Sweden	52
Germany	109	Switzerland	9
Luxembourg	13		

XDC's mission is: "The development of one major pan-European digital cinema network by offering technical and financial customized solutions and all the related services". The company provides a range of technical, financial and operational services from postproduction through distribution to exhibition. XDC's approach stresses flexibility and they are not tied to a particular projector manufacturer. Currently they have cinemas with Christie, Barco, Kinoton and Cinemeccanica projectors in operation.

In March 2008 XDC announced that it will offer the full range of its deployment operations services to UK and Republic of Ireland exhibitors with the support of Sound Associates, the UK's leading cinema equipment integrator.²⁸ Although details have not yet been released, this new partnership arrangement could result in an attractive alternative route to digital conversion for a range of cinemas in Ireland.

The model that XDC has operated in the past is broadly based around virtual print fees which can be negotiated by XDC or by individual cinemas or circuits with film distributors. XDC offers a range of solutions to cinemas and cinema circuits.

Three options are available to cinemas:

- i) outright purchase at preferential rates
- ii) operational rental with service package, minimum period of 1 year, with the option to purchase the equipment after 5 years. Monthly rental charges of €900–€1,000 plus a €250 service charge are typically offered.
- iii) operational leasing with service package, available for 6, 8 or 10 years.

Both rental and leasing packages are offered for server only or server plus projector. No charge is made for the use of the equipment for pre-show films or advertising. The server security certificate (part of the 'key delivery message') is owned by the exhibitor. This means that any endorsed Third Party Lab can deliver digital copies on XDC equipped screens – XDC does not interfere with the negotiation of theatre rentals in any way.

The flexibility of XDC's approach may make the company attractive to several cinemas in Ireland. However detailed rental and leasing comparisons would be required from XDC and Sound Associates before a preferred option could be determined.

XDC's experience with digital cinema has highlighted a few issues which are relevant to the Irish situation. Several US "DCI-compliant" releases have not been distributed by US major distributors' regional offices. Just because a digital print exists in the US doesn't automatically mean that it will be available in Europe – yet. Complicating the situation further, some regional offices have serviced and/or acquired non-DCI studio properties for digital release.

Arts Alliance Media

Alongside the VPF package offered to cinemas in Europe, AAM is developing a 5-year

²⁸ See press release at <http://www.dcinematoday.com/dc/pr.aspx?newsID=1080>, dated 19 March 2008. Web: www.xdcinema.com and www.soundassociates.co.uk

lease purchase package which includes:

- Digital cinema projector (e.g. Christie CP2000-ZX or Barco DP1500)
- Multimedia switcher
- Digital cinema player/server (e.g. Doremi) and software upgrades as required
- Cinema automation interface
- Site survey, equipment integration, installation and commissioning

An illustrative quotation obtained for this report and based around the above installation suggests that monthly payments would be in the order of £1,100 (€1,570). Additionally an annual maintenance and support package would be compulsory, costing £2,200 (€3,140) per year rising by 5% each year.

Apart from the comfort provided by a full installation and support package the Arts Alliance package is approximately 5% cheaper than conventional lease finance from a bank such as HSBC or finance institution such as Lombard.

3.3.1 Europa Cinema 'flexible print fee' proposals

In November 2006, RMC Rinke Medien Consult GmbH reported to the Europa Cinemas conference on a potential business model for digital cinema in Europe. The research was commissioned in order to find out if a viable business model could be applied across Europe for all types of cinema, not just the cultural cinemas who are members of the Europa Cinemas network.

RMC's work is based on several critically important general assumptions:

- Acceptance of the DCI 2K technical standard
- The roll-out must be an 'open access' model available to all participants
- Security key management procedures must be agreed by distributors and exhibitors working together [RMC point out that German exhibitors, like US exhibitors, won't accept a system which allows film distributors to decide when a particular film should be played on a particular screen. In their view, scheduling and programming are the responsibility of the cinema operator.]
- Film producers should be responsible for the costs of producing digital masters and should be part of an all-industry approach to digital cinema
- The whole cinema market should adopt digital.

RMC state that a successful roll-out depends on all these points being answered satisfactorily.

A detailed examination of the cinema markets in France, Germany, England, Spain and Austria provided the data on which RMA base their model. They assess the benefit to distributors from distributing on digital compared to 35mm as €900 per print. However instead of a virtual print fee model RMC developed a 'flexible print fee' which they

suggest should be in the region of €3.00 – €4.80 per hour of screen time. This flexible fee would be paid by anyone using the digital projector – film distributor, alternative content provider, or advertisers. The flexible print fee is derived from an assumption that cinemas on average present 1,320 screenings per year per screen and that the digital equipment will be used for 7 years.

The flexible print fee approach has a further and critical difference from the VPF model. The payments from film distributors under the flexible fee are paid into a central fund which also receives public subsidies (national and international). The subsidies are required to assist the distribution of films to smaller cinemas and cultural venues. The central fund, which would be administered by national institutions as trustees, pays out to the individual cinemas or circuits according to their usage of the digital equipment. The contract between the central fund and the cinema provides the assurance and security that would be required for an individual cinema to arrange purchase or lease finance to install the digital equipment in the first place.

Film distributors would gain from the flexible print fee model although their main benefit would arise when a large number of cinemas participate. RMC estimate that there would be at least a 10% saving from the outset for distributors rising perhaps to 25%.

The greatest benefits from the RMC flexible print fee model would be achieved by multiplex cinemas and the least by single screen arthouse cinemas. RMC therefore argue that this simply means that an appropriate subsidy scheme would be required to supplement the model. They do however point out that any such subsidy should be viewed as a subsidy for the entire value chain with producers, distributors and exhibitors all standing to gain from the successful roll-out of the digital networks.

A broadly similar argument was presented at the Digital Cinema 2007 Conference by digital cinema consultant Chris Koppelmeier. He detailed a rollout plan for German cinemas which involves a mix of VPF payments (accounting for an estimated 50% of the total digital conversion costs) and government subsidy both being paid into a central pool and then distributed as conversion grants to all cinemas throughout the country. The aim of the proposal being to avoid disadvantaging the large number of smaller cinemas in Germany.

At present the flexible print fee approach has not been implemented but remains one of the few detailed alternatives to the VPF approach.

3.4 UFO Moviez

UFO Moviez is the Digital Cinema venture of UFO India Limited²⁹. The company is a major digital cinema company in the Indian sub-continent – a subsidiary of the \$1 billion Apollo Group – and has substantial worldwide expansion plans, including in Europe.

²⁹ UFO = United Film Organisers www.ufomoviez.com

UFO Moviez currently has 650 cinemas in India operating with its digital systems and plans to reach 3,000 cinemas worldwide during 2008. In 2007 the company secured \$22 million investment from UK private equity group 3i Group plc.

The system operated by UFO Moviez is based on MPEG4 compression and film distribution by satellite to the cinemas. The majority of the projectors are 1.3K or 2K units manufactured by Panasonic or by Digital Projection Ltd in Manchester (the latter received an order for 700 projectors in Autumn 2006).

The terms of a potential European roll-out offer have not been announced but are expected to involve high specification 2K digital projectors (not DCI standard) which are provided to cinemas free of capital costs, although a €5,000 partially refundable down payment is required at the outset. Each screening is then charged to the cinema at a flat rate of €10 (the usual terms of film hire with film distributors still apply).

A fundamental difference between this offer and the XDC leasing offer outlined above is that UFO would be providing projectors and servers which, while they are capable of outstanding picture quality, *do not comply* with the DCI security requirements of the major studios and so new release films would not be playable on the UFO systems. Until this situation changes a cinema could not operate solely with the UFO arrangement.

3.5 3D digital

An increasingly important additional factor which is spurring the roll-out of digital systems, particularly in the US, is the rapidly developing 3D market. Systems such as RealD, XpanD and Dolby 3D Digital Cinema are capable of excellent 3D cinema viewing experiences. Cinemas showing recent digital 3D releases including *Meet the Robinsons*, *Beowulf*, *Hannah Montana & Miley Cyrus: Best of Both Worlds Concert Tour*, and *U2 3D* have recorded more than double the average gross of cinemas screening in conventional 2D. Similar or even better results were achieved during trials in 2006³⁰.

Dreamworks has announced that from 2009 all its animated releases will be in digital 3D and George Lucas is remastering the entire *Star Wars* series in 3D – a seemingly impossible task but those who have seen the demonstration excerpts have been highly impressed. RealD is confident that live 3D concerts and sports programming will start during 2008 and that there will be more than 4,000 RealD 3D screens globally by 2009. In October 2007 RealD signed a deal with Odeon and UCI for the installation of 500 digital 3-D systems across the UK and Europe.

While the RealD system is currently the market leader, two competing technology approaches are being developed for digital 3D: active and passive. XpanD and Dolby are promoting active 3D systems which use a conventional matt white screen but require the use of special electronically shuttered or colour-filtered eyewear which introduces extra cost, maintenance and cleaning requirements for the cinema³¹. The

³⁰ Screen Digest, June 2006, reported that cinemas in the USA playing 3D digital versions of films achieved 2.3 times the revenue of conventional 2D cinemas.

³¹ Reusable 3D glasses must be collected in by cinema staff and then sterilised in commercial glass washers before being handed out again. The cost of the special glasses are around \$50 per pair.

alternative RealD system uses lightweight disposable polarising glasses but requires a silver screen to be installed in the auditorium.

All the 3D systems reduce the amount of light visible by the cinemagoer – by the projector filtering system and by the viewer's spectacles – and so higher power lamps need to be used in the projectors to overcome light losses of over 50%. Generally these higher power lamps have a shorter lamp-life and are more expensive. Dual projector systems are also being used to overcome the reduction in image brightness caused by 3D systems. Overall, the extra costs of running 3D digital may prove to be considerable and the choice of system is currently complicated by many technical, operational, financial and licensing issues.

The major studios are placing great emphasis on 3D digital for the future but the reality is that this is likely to remain a premium sector suitable for larger multiplexes where the additional costs and operational issues can be accommodated. Nevertheless newly designed cinemas of any size should consider making provision for 3D digital, for example by allowing extra space for a spectacle washing and drying facility near the auditoria entrances. 2D cinemas in the vicinity of a 3D cinema will probably continue to experience a considerable fall-off in attendance but only a limited number of the 500+ films released annually are expected to be distributed in 3D versions. Some genres of filmmaking, such as documentaries or some dramas, may not prove to be suitable for the 3D approach.

4 Implementing digital cinema in Ireland

It is clear that while there are still substantial, occasionally daunting problems that remain to be solved, digital cinema is a reality and is rapidly expanding across the cinema world. Deciding when and how to enter the fray is difficult but many people³² believe it is sensible to start now and work through the problems rather than wait until it is all resolved. For smaller specialist cinemas the issue is arguably more urgent than for multiplexes.

4.1.1 Distribution issues

For distributors and exhibitors in Ireland the reliance on US studios and the London offices of major and independent distributors means that there is far less freedom of operation than might be the case in mainland Europe where local language films can account for a substantial portion of the market.

The distribution of many independent and foreign language films is increasingly reliant on digital prints. In the UK several London-based independent distributors, and one Scottish company, are building good working relationships with the UK Film Council-backed digital screen network. These distributors are not paying virtual print fees in order to get their films on UK screens (including Queen's Film Theatre) and they are unlikely to be willing to pay to get the films on screens in Ireland. If the films are only available as digital prints, Irish distributors will be unable to handle these titles. Specialist cultural cinema programming may be adversely affected as a consequence.

4.1.2 Training issues

Digital cinema equipment presents cinema projectionists, engineers and managers with new challenges and high quality training is essential. A number of training opportunities exist, some provided as part of an installation, others open to anyone.

Arts Alliance Media / Digital Screen Network

Arts Alliance Media (AAM) have created a dedicated training facility at their London headquarters. Cinemas taking part in the Digital Screen Network must send at least one (ideally two) projectionist to a free 1½ day training course which combines tutorials, group exercises, hands-on equipment training and concludes with a test. Printed course materials are supplied in addition to the equipment manuals. All trainees who complete the course and pass the final test are awarded a certificate stating that they are "Certified Equipment Operators". Over 300 projectionists have been trained on this course.

During the installation of the digital equipment the AAM engineer provides further on-site training to the cinema's projection staff. Experienced digital projectionists and technicians are offered a free one-day advanced training course which concentrates on operations such as automation integration, screen configuration and maintenance procedures.

³² For example David Monk, DLP pioneer and Chief Executive of the European Digital Cinema Forum speaking at the UK Cinema Conference in London, March 2007.

BFI Southbank

Complementing the AAM training the Technical Services Department at BFI Southbank (incorporating the National Film Theatre in London) are offering a Skillset certified 1½ day course concentrating on the technical issues associated with presenting alternative content on digital projection systems. The 'Multimedia Box' course provides a detailed understanding of the complex issues that projection staff may face when dealing with the many different digital source materials that the new equipment makes possible.

Digital Cinema Ltd (Ireland)

The summary contract from DCL states that *"In a single session, full training will be provided free of charge to all theatre staff in the use of the digital cinema equipment. Training will include start-up function, movie loading, the creation of playlists or shows, and basic care of the equipment. Additional training is available for a fee."*

Media Salles

In Europe Media Salles organises an annual training course in April for cinema operators (owners, venue managers, and technical staff). The 'DigiTraining Plus: New Technologies for European Cinemas' course has for the past two years been held over 4 days at Barco's headquarters in Belgium. The course content includes sessions on:

- The state of the European and International market for digital screening
- Overview of technologies
- Exhibition and distribution
- Digital cinema economics
- Market potential
- E-cinema, D-cinema, 3D cinema

Ateliers du Cinéma Européen

Occasional courses aimed at film producers. A course focusing on digital cinema was held in London at the end of April 2007). The course was partly sponsored by Arts Alliance Media.

FAS/Screen Training Ireland

A seminar on digital exhibition was held in Dublin in January 2008. The course was partly sponsored by FAS/Screen Training Ireland and Irish Film Board.

BKSTS Cinema Technology Committee

An occasional ½ day seminar targeted at projection staff and usually held in Birmingham. The aim is to raise awareness about digital cinema technologies and to provide "real information to balance some of the rumour with which our industry is rife". Topics for the April 2007 course included:

- Demonstration of JPEG2000 content
- Explanation of how digital projectors work and a comparison between 35mm and digital projection of the same sequence

- An introduction to the new jargon
- Alternative content
- Digital advertising

4.1.3 Roll-out costs for Ireland

Specialist cinemas

If the IFI, Lighthouse, Kino and Solas along with the major arts centres currently screening on 35mm were all to convert their screens to DCI standard digital cinema operation the current equipment cost would be in the region of €70,000 to €80,000 per screen, a total equipment cost of €1.75– 2.00 million for approximately 25 screens. Installation, training and service back up costs would be additional. With the newer, less costly projectors recently announced the equipment cost may be reduced by €250,000, possibly more (for example a 25% discount) if a bulk purchase discount could be negotiated.

All cinemas

DCL aims to convert 500 screens to DCI standard digital projection by 2009. This will require a roll-out rate twice as fast as Arts Alliance Media achieved in the UK. The total cost of the UK Film Council roll-out (i.e. equipment, installation, training and support services, network operations centre, upgrades during roll-out, etc) for 238 screens was around €20 million. It is reasonable to anticipate that the costs DCL will incur will be at a broadly similar level, and they should be able to benefit from significant bulk purchase discounts as well as the lower costs of the new range of equipment. Overall these factors suggest a total investment of €30–35 million for the full DCL roll-out.

Training and support

Apart from the equipment cost any implementation of digital cinema clearly requires a structured training and support service. If a number of small, independent and cultural cinemas in Ireland are not included within DCL's roll-out it will eventually be necessary for these cinemas to find an alternative equipment and service supplier. Traditional cinema technical supply and support companies may be able to provide these services but it may be appropriate to consider contracting with a larger organisation such as DCL, AAM, or XDC due to their greater resources and experience.

Access to Irish films

A critical aspect for all digital cinemas is the supply of properly encoded and encrypted digital prints. The costs for producing digital prints are reducing. Dolby has recently launched a new JPEG2000 digital cinema mastering system – the Dolby SC2000 Secure Content Creator which enables the compression, encoding, digital packaging and encryption of digital films. This equipment is being made available to post-production facilities, laboratories and exhibitors. Local encoding and encryption is now a practical proposition.

To assist the digital distribution of Irish films, notably those supported by the Irish Film Board, it may be relevant to consider inserting a clause into production or distribution funding support packages that the delivery of an appropriately formatted digital master forms part of the contract. This would ensure that the process of producing digital distribution prints was simplified. (Note that digital prints destined for cinema screening are graded differently from those destined for HD television usage, so two digital masters may be required from producers.)

4.1.4 Roll-out options for Ireland

A number of digital cinema options are potentially available to commercial and specialised cinemas in Ireland:

- i) Enter into a VPF contract with DCL – this option applies to the majority of commercial cinemas in Ireland but is expected to exclude smaller cinemas and cultural cinemas.
- ii) Enter into a VPF contract with Arts Alliance Media – note that this arrangement only applies to conversions, new build projects do not qualify
- iii) For the cinemas excluded from DCL's commercial roll-out, subsidy might be provided to ensure that cultural cinemas could participate in the DCL roll-out. The subsidy could take the form of a fee to DCL or perhaps partial payment of the VPF.
- iv) Take up the special digital cinema 5-year lease package from Arts Alliance Media described above (3.3.1)
- v) Negotiate an arrangement with Arts Alliance Media, or XDC in partnership with Sound Associates, to provide to provide a broadly similar package of supply, installation, training, support and print delivery services to those which form the UK Film Council's Digital Screen Network.
- vi) Establish an Irish Digital Cinema fund which could assist cultural cinemas and arts centres by subsidising the purchase or lease digital cinema equipment. The venues would then arrange the supply and support services with the vendor of their choice.

New cinema developments

The 90-seat, single screen, specialised Kino Cinema in Hawkhurst Kent has demonstrated that it is possible to run a varied cultural programme at a small 100% digital cinema. A number of new cinema entrepreneurs are considering, or actively developing, new models of cinema based entirely on digital cinema technologies – from internet marketing, integrated accounting and management systems through to the digital projection systems which are the focus of this report. These new business models offer a different approach to the problem of how to provide smaller communities with a varied yet high quality cinema-going experience.

The Cultural Cinema Consortium could develop a support programme which encourages the development of new digital cinemas in areas that are currently lack appropriate provision. The ability to screen alternative content could be an important factor which would allow a broader range of cultural events to be presented, for example music or drama relayed from other parts of Ireland or other countries.

Appendix 1 The advantages of Digital Cinema

Benefits	Producer	Distributor	Exhibitor	Audience	Nation
Savings in Print Cost	Nominal one time investment for Digital Prints. Also possibility of releasing old films	No investment for Digital Prints	No investment for Digital Prints	No increase in Ticket costs	Savings of foreign exchange in importing film stock
Wide Release of Film	Early release in all centres protects film from piracy and adverse publicity	No investment for Digital Prints allows distributor to give as wide a release as possible with no extra costs	Digital Distribution reaches even rural centres on day of release	Audiences in rural and remote areas will get access to new releases on day of release	Increase in cinema collections means increased entertainment tax revenues
Durability of Media	As opposed to optical prints which deteriorate in quality, digital prints will have virtual	No expenses on reprints in case of a hit film and no loss in case of a flop	No hassles such as bad quality prints, delivery dates etc	Good and uniform viewing experience	Good quality prints shall result in increased collection
Curb on Piracy	Digital content protection software restricts piracy	No expenses on reprints in case of a hit film and no loss in case of a flop	Maximizes a films theatrical potential in the initial period thus increasing revenues	Access to good quality theatre viewing in the early part of a films life	Curb on piracy will increase cinema collection
Promotes Niche Cinema	Producers are able to experiment with newer genres of cinema	No risk situation since investment in prints and copyright in minimal	Provides access to newer variety of cinema	Provides access to newer variety of cinema	Encourages film production and enhances revenue potential
Promotes regionally specific films	Golden opportunity to invest in regional films	Generates newer revenue streams	Provides access to newer variety of cinema	Provider access to newer variety of cinema	Encourages film production and enhances revenue potential
Lower Break Even Point	A wide release ensures early recovery of money	Early recovery of investments in copyright print and publicity	Decreased expenses on account of running cost of theatres	Encourages producers to make good and meaningful cinema	Production of more films will increase cinema collections

From UFO Moviez web site (www.ufomoviez.com)

Appendix 2 Arts Alliance Media Virtual Print Fee proposals



**ARTS
ALLIANCE
MEDIA**

DIGITAL CINEMA

Arts Alliance Media is delighted to offer exhibitors the first digital cinema VPF deal in Europe

What is a VPF deal?

- A VPF – virtual print fee – deal is a mechanism by which distributors contribute towards the cost of the digital cinema equipment, using the savings they make switching to a digital format from 35mm. Every time a film is booked digitally, the distributor pays a virtual print fee.
- A VPF deal is a long-term deal, where digital cinema equipment is installed in a screen for 10 years, with distributors guaranteeing to make digital versions of content available and to pay VPFs when bookings are made.
- The required technical solution is fixed and agreed up front so exhibitors do not run the risk of equipment obsolescence.
- The model ensures distributors pay their fair share, and guarantees exhibitors access to content in a digital format.
- Distributors will pay a large percentage of the overall cost until a certain amount of screens are digitally equipped per territory.
- The ownership of the equipment remains with the exhibitor.

Cinema contribution

- The exhibitor will be asked to contribute a minor share of the equipment and financing costs, as well as cover service and maintenance fees.

Supply of films in digital and distributor relationships

- Under the VPF deal, we negotiate with distributors to agree their contribution to equipment costs and to guarantee availability of films in a digital format throughout the lifetime of the agreement.
- AAM does NOT act as a gatekeeper to the digital equipment: participation in the VPF deal is open to all distributors of content to your cinema
- We do NOT interfere with your relationship with distributors: film rental terms continue to be agreed directly between you and the distributor and there is no obligation to book particular films or work with particular distributors.

Equipment

- Under the VPF deal, AAM will provide you with future proof equipment.
- We install DCI-compliant equipment comprising of a 2K or 4K projector and a playout server for each screen.
- Any upgrades required to meet DCI v1.1 are included free of charge.
- We are manufacturer independent and will select equipment best suited to your needs. We have worked with all the major equipment providers.
- We integrate all equipment into your existing theatrical systems.
- We value the importance of local equipment integration companies and will work with them, wherever possible.
- Parts warranty is included on all equipment to ensure you are not ever exposed to technology risk.

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