



Digital projection in cinema

**Provisionnal document of the CNC (national centre of cinematography)
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Introduction: method and objectives

Following Daniel Goudineau's report and subsequent debates and developments, the purpose of this document is to submit for discussion by the various parties concerned the CNC's intermediary position on the main issues raised by digital projection in cinemas. The aim is to define the general framework for deploying digital projection, then, on this basis, to analyse the economic conditions for this deployment, and prepare the measures that appear necessary.

The CNC wishes to assist the introduction of digital projection while respecting the exhibitors' freedom of choice; to anticipate developments that fall outside the fundamental principles indicated below, and to prepare for the initial phase, which is characterised by the coexistence of the two screening methods in the short- and medium-term, and the maintenance of physical supports for digital projection.

Digital projection in cinemas needs to be implemented according to the fundamental principles that lie behind the approaches and proposals explored in this document, which aim to guarantee the continued existence of the current system with its diversity of programming and high level of creativity, as follows:

- the quality and security of digital projection,
- a similar technological level for all cinemas,
- the neutrality of technology regarding the prevailing relations between the various players in the film network (guarantee of independent programming).

I – Standardisation and certification

Digital projection in cinemas needs to adopt standards equivalent to those cited in the recommendations of America's DCI¹, not only in terms of the quality/security of projection, but also to guarantee access to American films. (This would not prevent additional video/e-cinema equipment, as is already the case today.) Standards are already largely defined, and certification procedures would enable the network to be made secure. The issue here is to develop places and tools for professional information and exchanges.

A – Adopting standards at European and national level

The AFNOR norm

The AFNOR S 27-100 norm (digital/electronic cinemas) was published in July 2006 following the work initiated by the CNC and undertaken by a standardisation group. This was chaired by the CST (French higher commission of image and sound) and consisted of the professionals concerned – the FNCF and FNDF (French national cinema and distribution federations), FICAM (French audiovisual technical industries organisation), manufacturers, directors of photography, etc. – and the Centre.

This norm, which specifies the format of images transmitted to the projector and the minimum technical performance of projection equipment, only takes the final characteristics of sounds and images into account.

It is totally compatible with the DCI's recommendations, but has a far smaller scope, and does not specify aspects regarding file format, security and so on.

It explicitly imposes a minimum resolution of 2K for projection equipment, and implicitly, the Jpeg-2000 compression standard.

Interoperability and film recording supports

Since the publication in June 2005 of the DCI specifications, the SMPTE (Society of Motion Picture and Television Engineers) has been in charge of their transformation into a single norm. This procedure will probably be completed sometime in July 2007 (half the batches having already been published)².

However, the two crucial questions concerning the interoperability of equipment and film recording supports have only been very partially addressed by the SMPTE's work.

The CNC could, in conjunction with the FFA (Filmförderungsanstalt, the German film regulation body) and with help from the CST and the Fraunhofer Institut (German research laboratory), engage an approach whereby they could be dealt with.

However, given the very tight schedule, the best solution is probably to take action by defining the good practices to be maintained between professionals in liaison with the American association ISDCF (see point C below).

¹ In June 2005, the seven principal American studios in the DCI (Digital Cinema Initiative, consisting of Disney, Fox, MGM, Paramount, Sony, Universal and Warner) published the definitive version of their specifications on digital projection and distribution.

² Later on, the standard published by the SMPTE will probably be brought into line with the international ISO norm. However, while this ISO standardisation would give the SMPTE standard an undeniable legal foundation, it is clear, as is the case, for example, in the field of HD television, that the SMPTE standard would have force of law on an international level.

Security

The question of security is largely covered by the DCI recommendations and the future SMPTE standard. Consequently, the CNC could simply have these recommendations assessed by the DCSSI³ to ensure that they included every aspect.

B – Self-certification of equipment – certification for the manufacture and secure transportation of prints – certification for key generation

Self-certification probable for projection equipment

At the request of the American studios, the Fraunhofer Institut drafted a complete procedure for tests for the application of the DCI recommendations (thus without awaiting the publication of the SMPTE standard). Since then, the DCI has designated a new company, Cinecert, to continue the Fraunhofer Institut's work. Cinecert's role will mainly consist of defining, within the next six months, how equipment and distribution chains are to be certified.

If no decision is then made, it is nevertheless widely accepted that the manufacturers providing servers and projectors will be put in charge of certifying their equipment themselves.

Certification of laboratories and key management

However, there is still the question of certification for the manufacturing and secure transportation of digital prints, together with certification for key generation. The American studios have issued no rulings about this, but could carry out private audits (or via the MPAA⁴) on laboratories and technical service providers.

As regards France,

- ***Concerning the manufacturing of digital prints***

Certification can only be envisaged on condition of standardising the future SMPTE norm and identifying "trusted third parties" in charge of monitoring the respect of this norm. A less cumbersome and more effective solution would be to create a test platform that would be open to the entire profession, and whose results would be widely distributed (see point C below).

- ***Concerning the generation of keys***

In France, computer security certification is extremely regulated, notably by order no. 2002-535 of 18 April 2002 relative to the assessment and certification of the security offered by information technology products and systems.

³ The DCSSI (central information system security department) belongs to the SGDN (national defence general secretariat). It deals with computer security regulation and certification, the management of international agreements in this respect enabling the mutual recognition of procedures for national certification, and computer security regulations. It possesses technical laboratories enabling it to carry out operational assignments for ministries (such as the monitoring of sensitive sites and security control). Its other mission is to advise administrations in its own field.

⁴ MPAA: Motion Picture Association of America

This high-level certification is managed by the DCSSI, backed up by CESTI (information technology security assessment centres). An official submission to the DCSSI would make it possible to seek the benefit of its expertise.

From then on, two solutions could be envisaged: high-level certification under its aegis, or more simply, if the risks inherent to this solution turn out to be negligible, a test procedure open to the entire profession (as indicated above for the manufacturing of digital prints).

C – Tests and information

In addition to the certification procedures carried out at national and international level, it is vital that the various professionals have access to reliable information on equipment and digital distribution processes, together with the venues of tests.

The CST could thus create a guide to all these issues, which would be updated on-line.

The ISA⁵ platform is also a good test tool for the entire chain of the manufacturing and distribution of prints.

The question arises on the durability of this platform and its extension to the entire chain. In this respect, some players are considering projects involving tests under real conditions (the normal and commercial conditions of exhibition). These tests should be encouraged or even financed, for example within the framework of RIAM (audiovisual and multimedia research and innovation) project tenders.

Generally speaking, it would be advisable to create a work group to study the technical and norm-related aspects, which could be managed by the CNC and the CST, and whose mission would be:

- to pinpoint the tests and experiments needed,
- to pinpoint the practical problems of interoperability,
- to enable the grouping of different test platform initiatives in order to avoid dispersing the means implemented,
- to exchange with our European partners, particularly the Germans, whose work in this respect is particularly advanced.

This work group should bring together representatives of the professionals concerned via their federations (FNCF, FNDF, DIRE (united independent European distributors), FICAM), and manufacturers.

It should be noted that an initiative of this kind was taken in the United States following the DCI's work. This involved the ISDCF association bringing together the technical directors of studios, manufacturers, and so on. The work group could be the ISDCF's French "correspondent" and national contact.

⁵ The ISA platform is a project financed by the CNC within the RIAM network, which is managed by the CST and associates the following partners: Eclair Digital Cinema, Smartjog, CN Films, Thomson, Doremi and Open Cube.

D – Guarantees as regards exhibitors

Respect of the AFNOR Digital Cinema norm

Respect of the AFNOR S 27-100 norm should be ensured at the time the operating permit is granted, from the moment a cinema is digitally equipped. Video projection machines inferior to the 2K standard could be admitted, but only as additional equipment.

The current operating permit will be maintained. Control will be undertaken by a certifying body empowered by the COFRAC⁶ (CST or another body) prior to authorisation. At the same time, the current control of plans on paper should be adapted in respect of the AFNOR S 27-001 norm concerning the dimensional characteristics of cinemas, and the abolishing of systematic retroactive control should be envisaged.

Security as regards exhibition

The set-up of equipment compliant with DCI/SMPTE norms, particularly with regard to security, guarantees the security of the site. There is therefore no need for any additional action in this respect.

E – Availability of French films on digital supports

Today, a growing but minority proportion of French films are processed digitally in post-production and would thus be available on a digital support for distribution in cinemas. This depends on both the cost factor and the technical procedures used in filming and production. It is vital for digital post-production to develop in order to facilitate not only digital projection in cinemas, but all methods for exhibiting films: HD TV, HD DVD and VOD.

The availability of films on a digital support is a priority and will be factored into the funding schemes managed by the CNC (see also III –B)

Two complementary actions will also be necessary.

Listing the films available in digital format

This would involve listing encrypted films for digital distribution in cinemas, or which dispose of a digital source master, and assess developments in this respect.

Two further sources of information are available:

- a questionnaire that is now attached to the approval application form
- a catalogue regularly updated by the company CN Films (organiser of the IDIFF digital film exhibition), which receives support from the Media programme for this purpose. This database is now on line (<http://www.difim.org>) and can be constantly updated by producers, distributors and technical service providers.

• Modernisation of budget approval

Modernisation here should enable digital post-production to be taken into account, as well as changes in key items and the type of work involved. This will be examined in the meetings of an Approval Commission work group between June and September 2007, then formalised.

F – Legal means

The issues relating to digital projection in cinemas are essentially covered by the general regime for standardisation, and the close relationship between national and international regulations in

⁶ The COFRAC is a body in charge of accrediting structures required to verify respect of French standards.

this respect. As the law stands today, cinematographic regulations only address these indirectly, and exclusively in terms of cinema exhibition.

In this area, respect of the AFNOR S 27 001 norm on the dimensional characteristics of cinemas is a condition that must be met by all exhibitors in order for the Managing Director of the CNC to issue the operating permit stipulated by regulatory ruling no. 12 of 2 March 1948.

Meanwhile, the AFNOR S 27 001 norm relative to digital film projection cinemas was approved on 20 June 2006 and became effective on 20 July 2006. As with the AFNOR S 27 001 norm, this new norm needs to be integrated into regulatory ruling no. 12 of 2 March 1948 and become a condition for issuing digitally equipped cinemas with an operating permit.

More generally, taking what exists in electronic communications as a model, it could be appropriate to set up specific measures governing the norms on digital cinema equipment and techniques, whose basis would of necessity be legislative. On this basis, compliance with certain technical specifications could be made obligatory by decree.

Lastly, the use of a contractual instrument should be encouraged, particularly through agreements signed between the various players concerned, under the aegis of the public authorities..

II - Relations between the various players, and their respective responsibilities

The arrival of digital projection in cinemas has led to the appearance of new activities in the film production and distribution chain, exercised by existing or newly created companies, or those developed for the purpose. These activities include the installation of equipment, its operational management, and the generation of keys to read these films. All this hitherto unfamiliar know-how could raise the fear of a power takeover by new players, and challenge the way responsibility is currently shared.

Two main models become apparent: the first where the installer (or third party investor) is more or less entirely responsible for equipping the cinema and managing digital projection, financing itself directly by the distributors, at least in part; the second where the exhibitor itself orders and finances the various services it needs. A third scenario, imposing the public or parapublic centralised management of certain links in the chain, including the generation of keys (which does not seem to inspire a minimum consensus within the profession), would necessitate cumbersome legislative measures that would risk rapidly becoming obsolete for technical reasons. The second, median path, reinforcing the exhibitor's responsibility but providing guarantees through regulatory elements, thus appears the most preferable.

Distribution

Distribution is the activity that could potentially be most affected by certain digital projection deployment models. As the role of distributors is decisive in supporting films and furthering diversity in programming, it is important to preserve their current characteristics and responsibilities.

- The distributor should be the principal for digital prints, as with 35mm prints. These print runs should be governed by specific contracts with freely selected service providers.
- The distributor should provide the exhibitor with digital prints of films compliant with the required standards, excluding any other programme element.
- It should also be the distributor's responsibility to order the keys for reading films corresponding to the agreements (oral or written?) concluded with exhibitors, from the service provider of its choice, within the framework of a specific contract.
- The distributor must be able to access all cinemas on the basis of transparent, non-discriminatory prices. It is on this point that the "third party investor" model, if used, must provide the necessary guarantees, insofar as distributors that have previously signed contracts with the equipment manufacturer would be preferred.
- The distributor receives feedback on the conditions under which films are exhibited.

B – Exhibition

A cornerstone of the edifice will be the contract(s) concluded by the exhibitor for digital projection equipment in its cinema, and the operational management of this. These contractual clauses must guarantee the exhibitor's prerogatives, the transparency of the system and its non-proprietary character.

- The exhibitor must control its programme according to its contractual relations with distributors; for any film, it must dispose of keys covering all the projection halls in the cinema.
- The exhibitor must provide the distributor with comprehensive information on conditions for exhibiting the film (via "logs"), either directly or by delegating this task to the service provider in charge of managing its digital exhibition system, under its responsibility.
- Exhibitors provide the CNC with the certificates of their servers, and the CNC holds a register of cinema keys, thus ensuring an open and transparent system. This register could have two roles, which have different aims:
 - being a simple list, accessible on the Internet, of cinemas equipped with digital equipment, indicating the certificate of the corresponding servers,
 - being a real operational tool for all digital distribution players (including exhibitors, distributors, laboratories in charge of manufacturing and dispatching keys to unlock films, and projection equipment installers). In this case, the tool should make it possible to update the register in real time via secure access channels, and be provided with 24/7 maintenance facilities. After that, the cost of creating and managing this tool will need to be considered, as well as the industrial responsibility associated with it.
- Screening of programmes other than cinematographic works: this could enable the exhibitor to diversify its resources, but must remain marginal in relation to film exhibition. All sessions are subject to the cinema ticket tax, but only films generate support: any other kind of showing could be identified (through the allocation of a generic number, for example, to be indicated by the exhibitor in its declaration for "non-film" admissions).

Equipment manufacturers and technical service providers

- Generally speaking, service providers are not allowed to link several services of different natures in a single contract, nor make one dependent on another, and must be totally neutral in relation to the exhibitor's choice of programme.
- Equipment installers will probably be operational managers in the majority of cases, in order to provide the guarantee of smooth operation desired by the exhibitor. A certain number of contractual clauses would thus seem indispensable, especially in the case of direct financing with distributors: the transparent, non-discriminatory treatment of all distributors (including the question of price conditions, depending on the nature of distributors' commitments – see above); prohibition from being in charge of programming; prohibition from imposing other services through either a contract or technical constraints.
- There is also the issue of equipment ownership, which could be held by the installer or the exhibitor, both models having advantages (the guarantee of permanent adaptation; impact on the accounts). However, at the present time, CNC regulations do not permit the financing of work where ownership is not involved.

- Key-generating companies must offer security guarantees, and laboratories that manufacture digital prints must respect international standards (SMPTE): there is therefore the question of certification for these two types of agent (see above).

D. – Legal means

The question of linked services comes under the framework of bilateral contractual relations between exhibitors and service providers, and depends on the relation of force between the parties. Generally speaking, the fact of linking several technical services of a different kind is deemed as abuse of a dominant position (L.420-2 of the French Commercial Code). The characterisation only intervenes retroactively, and assumes the existence of the service provider's real position of economic power in the market said to be relevant, which in this particular case remains to be decided.

Regarding the transparent, non-discriminatory treatment of distributors in particular, the right to competitiveness penalises discriminatory practices (L.442-6-I of the French Commercial Code). But here again, it consists of a retroactive penalty. An interprofessional "Code of Good conduct" might be considered, which could then impose a number of rules and principles in advance. However, an agreement of this kind could be qualified as illicit if it distorted or restrained competition (L.420-1 of the French Commercial Code), unless it could be proved that it ensured economic progress.

In all these cases, if guidelines are to be established at an earlier stage for contractual relations between the operators, either by imposing certain public policy clauses into contracts, prohibiting certain clauses or setting up an approval mechanism, recourse to the law is indispensable.

Likewise, it seems that legislation would need to be adopted in order to set up an obligatory register for keys, managed by the CNC or by a body it has approved.

III – Cost and financing

Everyone accepts that the savings made by distributors will be allocated to financing equipment for cinemas, according to amounts and distribution models that have not yet been decided. But during the transition period, whether such savings will actually be achieved is by no means certain. It is equally clear that exhibitors will have to shoulder part of the costs, whatever solution is eventually decided. At present, most of them are already severely indebted, due to the modernisation of cinemas that has been going on over recent years. A collective approach is needed to find appropriate solutions, especially for small and medium-sized exhibitors. Insofar as the model of "third party investor" seems difficult to adapt to France's situation because of the wide diversity of the distribution and exhibition sectors, financing methods mobilising a whole range of means need to be determined, and public funding needs to be a part of exhibitors' independence in programming.

A - Exhibition

A1– The cost of digital projection equipment

- Downward trend: while there is no doubt that equipment prices will fall, as with other computer and electronic equipment, the exact extent of this downturn is still an unknown factor, even more so since it closely depends on how the production of these manufacturers develops, or in other words, the rapidity with which this equipment is deployed.
- Diversification of projectors and adaptation to the size of screens: some manufacturers will shortly be offering projectors adapted to very small screens, and thus less expensive than current equipment.
- Useful life and writing-off period for equipment: certain third-party investors and manufacturers are responding to this problematic issue through maintenance contracts. For a fixed monthly outlay, the durability and updating of equipment are guaranteed for the exhibitor.

A2 – Financing models

Depending on the variety of cinemas' economic situations and the as yet unclear character of economic models that could apply to exhibitors' digital equipment, it seems preferable, rather than seeking a single lever, to work on a wide range of instruments in addition to existing mechanisms, which could be complementary:

- The possibility of increasing exhibitors' mobilisation of automatic support: digital equipment costs are already eligible for inclusion in the expenses taken into account for automatic support. Two advantageous arrangements could be envisaged: the 100% deduction of digital equipment costs (instead of the 90% applying to other expenses), and making more widespread the option of granting aid through the direct payment of suppliers (rather than reimbursing the exhibitor for costs already laid out, as with other expenses), thus avoiding the extra expense of bank loans for exhibitors.
- The question of mobilising support in the event of non-ownership of equipment: as a dispensation from the regulation stipulating that aid should serve for the purchase and ownership of equipment, for digital equipment alone (to avoid this extending to other

expenses), the possibility of mobilising support could be envisaged, including in hire/lease models without the final purchase of the equipment. The impact of such an approach on exhibitors' accounts (expenditure as operating expenses rather than writing off investments, as is the case where a purchase is involved) remains to be seen.

- Possibilities of guarantees by the IFCIC: the volumes of credits granted to exhibitors are down (end of cycle for equipment and building work by big independent exhibitors). Now, without necessarily having to envisage increasing its grant, the IFCIC could increase the volume of guarantees on loans contracted for digital equipment. This intervention could be designed primarily for exhibitors in a fragile situation (thus with even riskier credits). In addition, the IFCIC's expertise and consultancy role with banks could lead to a position of consultancy with banks that receive applications for digital equipment credit (for example, length of loans possible depending on the equipment, maintenance contracts, etc.).
- What kind of coordination with aid from local authorities? Coordination with the authorities is necessary for three reasons: verifying the possibility/desire to aid the equipment of cinemas; carrying out an informative, educational action with authorities on the stakes at issue (current state of the equipment offer, financing models, distributors' current digital film offer) in order to avoid over-hasty investment (access for the cinema to digital films, in particular); and anticipating the risks of detrimental discrimination between public and private equipment.
- The advantage of exhibitor groupings in order to benefit from economies of scale: groupings of exhibitors would make it possible to attain a critical mass enabling more effective commercial negotiations.

B - Production and distribution:

In terms of production, studies have shown that the excessive cost of producing a digital source master (2K) can be minimised if it is integrated into the digital post-production process early on – already a widespread practice.

- Information seems crucial on the comparative economic situation of digital post-production networks (HD and 2K) and economies of scale linked to global digital exhibition, via the actions of the CST. This information should be accompanied by tests on bridges to be created between the various post-production networks according to the final distribution formats: digital screening, HD DVD, HD TV and so on.
- All digital post-production expenses should be taken into account as regards film tax credits.

In terms of distribution, the sector benefits in principle from savings arising from digital screening in cinemas. However, during the transition phase, the extent of these savings will probably be restricted and highly unequal from one distribution company to another. If need be, the CNC's selective schemes for distributors could be adjusted to take account of actual savings and the charges borne by distributors.

C. – Legal means

The system covering financial support for the creation and modernisation of cinemas could well be the first lever used to serve the financing of digital projection equipment. Adapting this mechanism would involve amending decree no. 98-750 of 24 August 1998 and its application orders. To the existing mechanism of automatic financial support, which could be extended to

expenditure arising from digital equipment hire, a specific selective financial support scheme could be added, if need be, created via the regulations.

In addition, coordination with territorial authority aid schemes could initially be organised by adapting, as necessary, the provisions of France's general territorial authority code, relative to the intervention of regions, *départements* and communities resulting from articles L. 2251-4, L. 3232-4 and L. 4211-1 of this code. Furthermore, the State/CNC/Regions conventions could also be adapted.

Lastly, new fiscal instruments could be looked into.

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The approaches laid out above as regards the technical, economic and legal points of view should be considered as working guidelines to be studied by the professionals, in view of aiding preparations for digital projection in cinemas through discussion.