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DIGITAL RIGHTS

Background, Systems, Assessment

Please note that this paper is a working document of the services of the European Commission and has not been formally adopted by the Commission. It therefore does not propose any new Commission policies nor does it represent the position of the Commission as such. The paper is intended as a contribution to the current debate about digital rights management and provides a factual presentation of the current state of play and identifies some of the major policy issues surrounding the acceptability of DRMs.

SUMMARY

Digital Rights Management

The copyright environment consists of **three** main aspects: **rights** (what can be protected by copyright) **and exceptions** (e.g. copies for private use or for public libraries); **enforcement of rights** (sanctions for making illegal copies and for trading in circumvention devices); and **management of rights** (exploiting the rights). In the online world, management of rights may be facilitated by the use of technical systems called **digital rights management** (DRM) systems. The paper seeks to provide policy guidance on the use of technology at an important time. Directive 2001/29 on copyright and related rights in the Information Society (Copyright Directive) provides the legal framework in which DRMS will be administered. In particular, the Copyright Directive requires Member States to provide legal protection for technological measures which form the basis of DRMS. Member States are required to implement the Copyright Directive by the end of 2002. It is important therefore to promote the use of DRMS in order to better manage the rights in question.

DRMs consist broadly of 2 elements: the **identification** of intellectual property and the **enforcement** of usage restrictions. The **identification** consists in the attribution of a (standard) identifier (such as the ISBN numbers for books) and the marking of the property with a sign (such as a watermark). The **enforcement** works via encryption, by i.e. ensuring that the digital content is only used for purposes agreed by the rightholder

By way of example, **conventional encryption and digital signatures operate effectively for the transmission to the consumer**, but once he has received authorisation of use, as he necessarily must, it is very difficult to control to which uses he puts the content. Most techniques currently under way try to prevent illegal copying by **inserting watermarks or other signs** which signal to the hardware whether they are original. The hardware should then work only with legitimate copies, sometimes by itself, sometimes by verifying with a database of the right holder.

At present, DRMS have not yet proved widely acceptable to all players as not all the problems associated with technical protection measures and DRMs have been ironed out.

1. Firstly, **encryption systems remain vulnerable to being cracked or are perceived as being vulnerable**.

2. Secondly, **DRM systems can significantly reduce ease of use** and hence demand for digital content, especially if there are many incompatible standards.

3. Thirdly**, DRMs may go too far by preventing generally accepted uses**, for example by allowing an eBook to be read only once. Finally, if based on online verification, **DRMs may invade people's privacy** by tracking personal data and transmitting them to DRM managers.

On the other hand, widespread use of viable DRM schemes could bring about:

– reduced risk of illegal copying;

– alternative methods of compensating rightholders for the risk of such copying;

– use of new business models;

– a move towards compatibility and interoperability of DRMs.

The Commission's policy in this area is defined by the Copyright Directive. In particular, the Copyright Directive requires Member States to provide for "fair compensation" for private copying (and certain other exceptions). Although, fair compensation is left to Member States to determine, it should take into account the application or non-application of technical protection measures. It also provides legal protection against the circumvention of any effective technical protection measures. The Directive also encourages the compatibility and interoperability of different systems and considers it highly desirable that global systems be developed.

The Commission has also been co-financing research projects in this field for some 10 years. In the meantime, as the technology evolves, **new business models are beginning to emerge**

The widespread deployment of effective DRM systems could provide an alternative to, for example, copyright levies, as a mechanism to ensure "fair compensation" for rightholders**. The Commission Services should continue to encourage all players to develop operational, open and interoperable DRM solutions and to deploy them rapidly**. Clearly, this depends on the co-operation of the different industry stakeholders and requires if not standardised, at least compatible solutions, as well as an open discussion about the appropriate business models. The Commission could help to facilitate such a process by providing a platform for consensus-building among all interested parties, for example through a series of round table meetings.

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Introduction

Objectives of this paper

The aim of this discussion paper is to promote the use of "digital rights management systems" (DRM) for the legal distribution of digital content and to discuss what is necessary to make DRMs widely acceptable in full respect of the legal framework, notably Directive 2001/29 of 22 May 2001 on the harmonisation of copyright and related rights in the Information Society.

To that end, the Commission will also organise a workshop with representatives of all stakeholders on 28th February 2002 where issues raised in this paper will be discussed.

The copyright environment consists of three main aspects: rights and exceptions; enforcement of rights; and, management of rights. **This paper assesses the policy options available to promote the use of technology in the management of rights. It outlines some of the principal practical and economic considerations relating to the use of DRMs as defined below. These options are addressed in the context of the legal framework established in the area of copyright and related rights. To that extent, it concerns protected works or other subject matter in the digital environment only.**

The harmonisation of the rights and exceptions is fairly advanced as reflected in the 7 directives adopted in the area of copyright and related rights. The most recent measure is Directive 2001/29 , which is to be implemented by December 2002. The second aspect- that of enforcement of rights, is addressed in the *acquis communautaire* in the relevant provisions concerning sanctions and remedies. The forthcoming proposal on counterfeiting and piracy and related initiatives will advance harmonisation in the field of enforcement.

The notion of "digital rights" refers to copyright and related rights in the digital environment. These rights do not differ in principle from the rights that persist in analogue works. However, the term DRM refers to the use of technology to describe and identify digital content protected by intellectual property rights, and which enforces usage rules set by rightholders or prescribed by law for digital content. It is important to advocate the use of DRMs in order to better manage the rights in question. In the coming 18 months, the Member States will implement Directive 2001/29. During that time, we are likely to see the emergence of many different private sector initiatives in the field of DRMs. The paper therefore seeks to raise some of the main policy issues surrounding the use of the technology in question at this point in time.

For the technology to succeed, it should be operational, of wide application and accepted by all players in the market i.e. content providers, commercial users and consumers. It may be possible to identify and target particular initiatives suitable for the funding of research. It is hoped that this paper will facilitate a dialogue, which can assist in identifying such initiatives.

In our consideration of DRMs, we should bear in mind the following:

- the environment is changing fast and **new business models** are emerging;
- digitisation brings **new opportunities** for holders of copyright and related rights (i.e. new forms of content, new markets, new distribution channels) but also presents challenges and risks;

- digitisation also presents opportunities and challenges for users;
- certain technologies will prove acceptable whilst the market will reject those that are cumbersome or clearly do not work;
- if usage of DRMs increases so that there is critical mass, they would enable the operation of viable business models for the exploitation of content protected by copyright;

The design and deployment of DRMs will need to take into account these important issues. In short, they will need to be sufficiently open and flexible: open to ensure interoperability and accessibility, and flexible to allow the use of different business models by content owners.

Background

Technological developments have historically always had implications for the regulatory framework for copyright and have been at the origin of the need for modification. The limitations of analogue and offline technologies and platforms in terms of lower quality of reproduction and relatively high distribution costs have governed the traditional models of copyright management and the legal framework, which support them. On the one hand, **digitisation has transformed this traditional environment and has given rise to a potentially huge market for content**. It is now possible for individuals to produce and/or make an unlimited number of perfect copies of digital data (e.g. personal identification data or copyrighted data) at little marginal cost, and to distribute them world-wide, similarly at practically no additional cost. At the same time, **digitisation has also increased the risk of piracy with use of the same media to produce and/or make unlimited numbers of perfect copies.**

Legal framework

The legal framework in which DRMs would be administered is that of Directive 2001/29. Directive 2001/29 establishes a framework which balances incentives to create and distribute content with mechanisms which ensure appropriate revenue through the exercise of intellectual property rights and at the same also serves the interest of the public (individual users) by requiring access to copyright works for certain types of use.

The Directive harmonises Member States' legislation around the three main rights granted to authors, performers, phonogram and film producers (Articles 2 to 4):

- the right of reproduction
- the right of communication to the public including the right of making available, and
- the right of distribution.

Of particular relevance to this discussion paper are the following provisions:

- the exception to the reproduction right for private use on condition that rightholders receive fair compensation (Article 5(2)(b)):

- the form that such "fair compensation" may take (Recital 35); fair compensation is elaborated in a recital and the form is left to Member States to determine. The form, detailed arrangements and possible level of fair compensation should take account of the particular circumstances of each case.

- the requirement for the private use exception that any system of "fair compensation" should take into account the application or non-application of technological protection measures.

- the legal protection given to technological measures where used to protect works by outlawing the circumvention of any such measure and trade in anti-circumvention devices (Article 6);

- the legal protection of rights management information placed on a work by the rightholder in order to identify the work (Article 7);

- an optional and exhaustive list of **exceptions** to the 3 main rights for the benefit of society, or of particular groups or use in the public interest(Article 5) ;

- the requirement that particular exceptions (reprography, teaching or research, use by the disabled, copies made by certain libraries, archiving of broadcasts, use of broadcasts by hospitals and prisons, private use), be made available to users even where there is a technological measure in place (Article 6(4));

Management of Rights

The third element of copyright protection is the **management of rights**. Its scope encompasses the exploitation (on-line and offline) of rights including the commercial or transactional aspects pertaining to distribution, licensing, the relevant applicable law and forum and the conditions of administration of those rights be they by individual, central or collective management. At present, most of these issues are left to Member States' laws and are not yet harmonised. In the context of this discussion paper, focus is placed only on technological measures being developed today, which aim to control copyright material so that exploitation can be licensed, reported and paid for in the networked environment. These are generally called "Digital Rights Management" (DRM) Systems .

Effective management of digital rights depends both on the legal framework and the widespread availability of operational technology. The legal framework supports use of DRMs by protecting technical measures, and by requiring Member States to take into account the application or non-application of technological measures when providing for fair compensation in the context of the private use exception for which fair compensation is required, (Recital 35 and Article 5.2 (b)). **Technological protection measures and control systems**, can facilitate the effective management of rights and exceptions. Where technological measures are operational and effective, rightholders should be able to ensure appropriate exploitation and enforcement of their rights as well as adequate revenues by using DRMs. The legal framework provides for the possibility to avoid double compensation where copyright levies and DRMs would be used in parallel. This might have an effect in time on the existing arrangements for equitable remuneration such as the use of "copyright levies", (already applied in some Member States). The use of these levies varies but these may be or are already applied on any equipment which could potentially be used to make digital copies, including personal computers, CD-ROM or DVD burners, and even mobile phones.

Such technology needs to be robust, interoperable, open, applicable across different content-types, and acceptable to the consumer. Such technology needs to be agreed upon, developed and deployed by the private sector. These criteria should be determined by the market with the risk that possibly divergent or even incompatible standards will emerge.

The copyright directive 2001/29/EC contains a reference in Recital 54 that "compatibility and interoperability of different systems should be encouraged" (Recital 54). In addition, the directive provides that protection mechanisms should not "prevent the normal operation of electronic equipment and its technological development" (Recital 48). However, the directive is limited in such references and does not create any legal framework for standardisation at EU level.

In order to avoid that the emergence of incompatible standards hampers the achievement of this desired interoperability, dialogue and consensus-building at European level is worth exploring. The European standards bodies (CEN/ISSS) are willing to help evaluate the need for and possibilities for standardisation. They plan to investigate the available technologies and the extent to which their use is already standardised by industry consortia or may need to be standardised.

Digitisation is also transforming the ways content in its different forms is developed, distributed and exploited. New models of content distribution are emerging (e.g.“open source”software, peer-to-peer computing, "pay as you go", flat rate subscriptions, time-limited, etc.).

1. HOW DO DIGITAL RIGHTS MANAGEMENT (DRM) SYSTEMS WORK?

This section will present:

- the main functions of DRM systems and how they work
- an example of a DRM system
- EC contribution to the development of DRMs (i.e. research programmes)

(a) The main functions of DRM Systems

DRM systems generally provide two essential functions:

- **The management of digital rights** – which refers to the activity of identifying and describing intellectual property and setting the rules under which it can be used
- **The digital management of rights** –which refers to the activity of securing the content and enforcing the usage rules set by the rights owner or by policy makers (i.e. "societal rules", which aim to maximise the benefits to society as a whole).

The management of digital rights

Identification of the content to which the rights are attached is a pre-requisite for the effective enforcement of digital rights. The International Standardisation Organisation (ISO) has overseen the development of a number standard identifiers for content, including ISBN for physical books, ISWC for music compositions, ISRC for sound recordings, and ISAN for films. One private initiative in the United States has also developed the Digital Object Identifier (DOI), for the identification of digital content.

Once copyright material has been identified, it also needs to be **described**. Such information, which is usually referred to as **metadata**, includes information about ownership (e.g. author, date of publication, originating territory, etc.). Systems for the development of metadata are currently well advanced.

The identification and description of intellectual property is essential if **rules** are to be set to exercise digital rights. Today, such rule-setting is still fairly elementary. For instance, the rightholder in a piece of text might allow printing but not copying (possible with Mibrary.com: www.mibrary.com) . However, in the future, complex rules will be enabled by software like XrML (eXtensible rights mark-up language) from ContentGuard (www.contentguard.com). This computer-based language enables rightholders to set the parameters within which their intellectual property can be interacted with by users.

The digital management of rights

Once intellectual property has been uniquely identified, the metadata describing it elaborated and the rules for its usage set, it is necessary to find a way to ensure that the rules can be **enforced**. This can be achieved using **encryption**. Encryption is the process by which information is "**scrambled**" to make it unusable to non-authorised users. One particular system of encryption that is vital to DRM systems is the so-called **"Public-Private Key"**

system. Once encryption has been effected using the Public Key (which can quite safely be made known), decryption can only be done using the complementary Private Key, which is not made available to anyone except the owner.

Encryption processes are also required to provide certainty for consumers that the content they are acquiring is as described ("integrity") and from the source they expect ("authenticity"). This can be effected by the use of **digital signatures** using encryption technology. **Watermarking** is another technique that is useful for authenticating content. Finally, in order that content traded in the networked environment can be transmitted securely, both content and the rules governing its use must be protected while in transit. **Digital "wrappers"**, once more dependent on encryption technology, are used for this and most digital rights management systems rely on the use of such "wrappers".

It should be noted that the security level of the process chosen by the right owner can vary according to the type of content (e.g. its cost, price, sensitivity).

Examples of technologies, which perform these functions are provided in **annex I**.

(b) An example of a Digital Rights Management System

The process of Digital Rights Management involves various steps depending on the technology or system. An example is given below:

- **Step 1**

A user makes a request for content via the merchant's website. The request involves determining the specific use that will be made of the content.

- **Step 2**

A financial transaction, using a secure channel, is effected with a financial institution.

- **Step 3**

Once the financial transaction is completed, the merchant requests the content to be secured by the DRM, together with the rules for its use, and then it is sent to the user.

- **Step 4**

Information about the transaction is sent to a clearing house (e.g. a collecting society) for reconciliation with the fees from the transaction. The clearing house, having charged a commission for processing the transaction, passes the fees to the appropriate rights owners.

It should be noted that this example is not based on an "open" system in-so-far as the user can only access the content via the merchant website. Neither does this example take into account the possible re-use of the content after the transaction. Technologies are also being developed which allow rules to be embedded in the content itself irrespective of its source or support platform (i.e. Internet, CD, a copy, etc.). This means that the content will always "react" in the same way wherever the user encounters it.

(c) EC contribution to the development of DRMs

Through its various research programmes, notably the Information Society Technologies (IST) Programme, the Commission has been co-financing a range of projects, which aim to support the standard-setting process among industry consortia and ensure interoperability.

The first Community-funded projects began in 1990 under the ESPRIT programme and have continued through the 2nd to the 5th Framework Programmes and more recently in the INFO 2000 programme (multimedia rights clearing systems). **Over €20 million has been spent by the Commission on a total of 22 projects in the DRM over that period**.

A comprehensive inventory of these projects is provided in annex II.

These Community-funded projects can be divided into <u>four thematic groups</u>:

- Design of management systems and methodologies;
- Development of component technologies ("building blocks") (e.g. water-marking);
- Development of "control centres" (e.g. databases, platforms, information systems, portals);
- Promotion activities.

There are important market incentives for the various industry players to develop these technologies and systems. The role of Community funded R&D programmes should take this into account when deciding to what extent it is appropriate to continue to provide support for the development of the various technology components.

R&D support at EU level could target issues such as system integration and pilots, the promotion of standardisation with the objective of **establishing a global and open infrastructure for IPR management and open standards**, and carrying out socio-economic impact analysis.

2. POLICY IMPLICATIONS

DRMs are currently neither widely deployed nor widely accepted. There are a number of issues, which need to be taken into account to ensure their wide acceptability and to overcome certain obstacles:

- **The technology is not foolproof**

Technological protection systems, no matter how strong or sophisticated, will always be vulnerable to attack from hackers and pirates. **But DRMs may be accepted by the market because they do not need to be 100% foolproof**. Nonetheless, they will need to be sufficiently robust to be widely taken up by content owners

Legal safeguards are essential to support technological measures and protect them against unlawful circumvention and these are already in place.

However, the network dimension of the Internet means that any successful attempt to break through or circumvent technical protection measures can be distributed rapidly. The Internet also facilitates such practices as "peer-to-peer" computing, where networked computers can

be transformed into a single supercomputer, which can potentially be used to crack any content protection measures even more rapidly.

Some organisations are issuing challenges to the technical community to test out the robustness of their systems. For example, on September 6, 2000, the Secure Digital Music Initiative (SDMI – see Annex I) issued "An Open Letter to the Digital Community," inviting people to attempt to crack certain technologies they are considering for use in their system: "**the SDMI Challenge**". They set up a web site where music samples and some other information could be downloaded to aid in analysing the technologies. The SDMI requested that participants send the results of their watermark removal tools along with technical details of how the watermarks were removed. Following this, the SDMI would then offer participants the chance to sign a non-disclosure agreement in return for receiving a fraction of the prize money. Students at Princeton University in the United States successfully cracked the SDMI technologies.

Indeed, most of the currently available systems have been cracked or will be soon. Examples include Macrovision, CSS, as well as SDMI. These initiatives illustrate the limitations of static technical protection. Once implemented, they cannot be modified. They lack recovery and defence mechanisms – and a sponsor to deploy these techniques if the protection system comes under attack. Second generation copy protection and management systems draw inter alia on techniques developed for web-based and general e-commerce. They combine scrambling systems, encrypted cipher keys and watermarking techniques with management via communications networks. Several of the proposed systems are described in Annex 1.

DRM and broadcast conditional access systems (CAS) share some of these technologies. Recovery and renewability of protection are characteristics of conditional access systems (CAS), which need to withstand attacks from hackers. In general, CAS and DRMs have separate functions for now. CAS protects transport to the home and DRMs address usage in the home. One technical option being considered in Europe is to carry over the common scrambling algorithm used for scrambling in conditional access to DRMs. Five years into the future, the Commission services understand that CAS and DRM may be combined into a single, end-to-end protection system as this will be more efficient. Apparent "weaknesses" in first generation technologies need therefore to be put into perspective. More sophisticated DRMs under development may prove to be highly effective, drawing on e-commerce technologies and with conditional access functionality as appropriate.

- **User-related issues**

Consumer groups and user organisations are voicing their concerns that DRMs will change the way individual users can use content. They fear that individual users will not be able to enjoy the use of digital content in the same way as they have done in the past.

For example, whereas it is possible to buy a book, read it as many times as one wishes, and lend it to one's friends or family, use of a DRM system might limit the number of times one could read, print out and pass on (i.e. lend) an "eBook".

There are many good reasons to protect the rights of rightholders, content providers and distributors of digital material. While DRMs are mainly concerned with preventing the illegal use of digital material, it is less clear how DRM solutions protect the lawful consumer. **A concern that DRM solutions need to address is to ensure that the intended user of the content is not subject to any constraint on their lawful use of this content**.

- **Data protection and privacy**

As explained above, the fundamental purpose of technical protection measures is to preserve the economic and intellectual property rights of the rightholders as set out in law. However, in so far as DRMs may involve the collection and further processing of personal data in order to carry out the essential function of protecting the works, or in so far as they may also allow content owners to closely monitor and track the use of digital content, consumer organisations, privacy advocates, national supervisory authorities and the Commission are also concerned about DRMs affecting the fundamental rights to privacy and personal data as guaranteed by the EU Charter on fundamental rights and the EU data protection directives.

Indeed, the use of such technical means opens up another economic dimension because data about how the protected works are used is of additional economic value. Depending on the design of DRMs, they could identify the consumer and create individual profiles about the consumption patterns of protected works by individuals. At the same time, the lawful use of such data can be of benefit to those consumers who are interested in receiving a customised service, for example.

In order to avoid these risks arising it is essential that, as in other areas, personal data is protected and privacy is guaranteed also within DRM systems as required in Directive 95/46/EC on the protection of individuals with regard to the processing of personal data and on the free movement of such data. Furthermore, this specific issue has been identified in Recital 57 of Directive 2001/29/EC. It states that rights management information systems should incorporate privacy safeguards in accordance with Directive 95/46/EC.

According to Directive 95/46/EC personal data can only be collected and processed if this is necessary for a specific lawful purpose and based on legitimate grounds such as necessity for the performance of a contract with the data subject, compliance with legal obligation, the unambiguous consent of the data subject, necessity for the purposes of the legitimate interests pursued by the data controller where these are not overridden by the interests for fundamental rights of the data subject, etc. The individual must be informed about the purpose of the processing, the identity of the controller and all other elements to ensure that personal data are processes lawfully.

This means that if a DRM system does indeed need to process personal data, this need should be demonstrated and clearly explained as part of the application of the obligations laid down in Directive 95/46/EC.

Attention needs therefore to be drawn to the purposes of DRM systems (i.e. protection or other purposes) as well as the conditions and circumstances under which data is collected and processed by them. It should for example be avoided that providers of DRM solutions, which closely monitor the use of protected content by the individual user, could use or pass on the collected data for marketing or other purposes without their knowledge and against their will.

From the individual's perspective, the unlawful collection and processing of personal data for customer profiling and other uses by a DRM provider would constitute a threat to their privacy and could affect the willingness of consumers to accept DRMs.

An overview on the functioning of those DRM systems that involve the processing of personal data would be useful in order to evaluate the questions raised above and find appropriate solutions.

- **An emerging requirement for DRMs in digital television**

Effective DRMS is becoming a a more urgent short-term requirement for digital television, as DTV evolves towards new functionality. New technologies already in the process of deployment require protection to be extended beyond transmission of content to the home - i.e conditional access - to include consumption within the home. Personal video recorders based on computer hard disks enable storage of many gigabytes of encrypted and unencrypted content, whether this be conventional video programmes or application programmes like video games made available as part of an interactive TV service. In future, wireless home networks will increasingly link different appliances within the home. Content of different kinds will need to be protected and managed as it is transmitted around the home.

Content owners want to avoid a repeat of the Napster syndrome in respect of video content. They fear that the combination of digital broadcasting, digital video disk and uncontrolled digital copying could provide pirates with high quality digital master copies of programmes that could then be fed into the internet. Posting films on the web would damage the industry's economy, which relies both on territorial windows and media chronology windows in order to maximise returns. Currently, rightholders' concerns and the limited DRM capability of current equipment means that digital products like DVD players and DTV decoders do not have digital output sockets. They can only be connected to TV sets and displays using analogue links. This limits picture quality and recording capability. It prevents digital television both from replicating analogue recording functionality, and from achieving its full potential through new functionality. Implementation of DRMS will be important for maximising the appeal of digital television. This is a pre-condition for achieving digital switchover and the eventual extinction of analogue broadcasting. Only with effective DRMs can digital television achieve its full potential.

Rightholders also argue that DRM protection needs to cover digital versions of traditional consumer electronics equipment (television sets and monitors, decoders and recorders) and personal computers. Any limitation on PC functionality is likely to be controversial both with computer manufacturers and computer users.

- **DRM systems can be burdensome**

Technical measures, such as DRM systems, may lead to complex technical solutions that users do not want. Users may be confronted with numerous different and possibly incompatible systems and software, which need to be downloaded each time they wish to access content. This can be a burden and give rise to additional costs for the user. Such a situation would be counterproductive and become an obstacle to the easy access and distribution of content on the Internet. Ensuring globally interoperable standards and flexible and open systems is therefore a key policy issue. Interoperable global management systems should be designed in such a way as to ensure technology integration.

- **Copyright levies**

Because of the current instability of technical measures and their low commercial availability in the marketplace, some EU Member States may choose to apply or have already applied levies to digital storage media (e.g. CD-Rs, DVD-Rs, MP3), digital recording devices, or IT equipment (e.g. PCs, printers, hard disks, etc.). These levies, already applied in 12 Member States to analogue equipment, are designed to compensate rightholders for the risk of private copying of their content. Industry circles have expressed serious concerns about the likely impact of imposing copyright levies on digital equipment and especially on personal

computers. For example, they are concerned about the possibility of users being required to pay double compensation should the use of DRMs and application of copyright levies coincide. They have also pointed out that the fragmented application of copyright levies in the Member States could have implications for the Internal Market in cases where Member States may choose or have chosen to introduce them (e.g. Germany and France), whilst others may not (e.g. the UK).

Certain copyright levies may eventually be replaced by effective technical measures. Indeed, a growing use of technological measures should eventually lead to a natural, market driven phasing out of levies.

- **Open and Flexible DRMs**

DRM systems should be sufficiently open and flexible to allow rightholders the freedom to – in accordance with the legal requirements - enforce the rules they wish to apply for the lawful use of their content and so that they can be easily adapted to new business models.

In other words, DRM systems should enable rightholders to enjoy maximum flexibility, within legal boundaries, in setting the usage rules they wish to apply to their content, as well as enable them to adopt **new business models, which open up new and alternative revenue streams for their content**. Examples mentioned by some parties include bundling additional services with content (e.g. information, technical information/user manuals, "plug-ins" to adapt and update content, etc.), providing variations in quality of service, and advertising. Such models are being successfully applied in other fields such as software e.g. open source and free software and also by commercial vendors but not without controversy (e.g. eMusic, MP3). Whilst some such models may under certain circumstances provide revenue flows from alternative sources, they may bear no relation to the framework for the exercise and exploitation of intellectual property rights. Indeed, some of these models are strongly contested by certain rightholders and the economic viability of some of these models still needs to be tested in practice.

Ultimately, once solution could be to create an environment where content creators are able to choose whether they wish to protect their rights and receive remuneration or not on a voluntary basis. Technology provides for such flexibility and so does the notion of property, which of course includes the option to give it away, exploit it directly or find alternative means of exploitation.

3. LOOKING AHEAD

Against this background, we need to consider possible policy options which can be agreed between all those concerned (different industry groups, policy makers, users). In so doing, the following conclusions can be drawn:

- Directive 2001/29/EC establishes the main elements of the legal environment and an assessment needs to be made of the best means to promote the use of DRMs in the context of that legal framework which also takes into account the flexibility accorded to Member States under Directive 2001/29;

- Technological measures and DRM systems are a fundamental component of the management of rights and the possibility of new business models should also be taken into account in full respect of the legal framework for copyright and related rights. DRM

systems should therefore be designed to be **open and flexible** and facilitate the legitimate use of content;

- **Co-operation of all the private sector stakeholders is required in order** to develop the infrastructure that can achieve the acceptability of the technology in practice. A dialogue in the form of a series of round tables organised by the Commission could help to facilitate such a process;

- In this way, consensus should be encouraged, though the private sector should be left to ensure that technological systems are robust and are accepted by the marketplace;

- the deployment of a **global and interoperable technical infrastructure which** would facilitate access for consumers and for all producers should also be encouraged.

- **targeted research initiatives can be used to promote use of DRMs based on an initial assessment of available technology which identifies viable alternatives.**

- An overview on the functioning of those DRM that involve personal data processing would be useful in order to evaluate the impact of DRMs on privacy issues. Studies or projects in this area could be envisaged in the future.

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ANNEX I

(a) Examples of systems which perform key DRM functions

- **The Serial Copy Management System (SCMS)**

The SCMS, which resulted from negotiations conducted during the 1980s between record companies and consumer electronics manufacturers, is used on CDs, primarily to protect music. It uses copy control "flags" embedded in the CD. These "flags" allow digital copies to be made from the "master" CD (that is, the CD bought by the consumer in a shop), but not from a copy of that master. Thus, "second-generation" copies are blocked – if a copy of the original is used as the basis for a new copy, the control flags will be incorrect and the copying device (CD recorder) will fail to copy from it. Serial copying is prevented. Thus SCMS principally performs an **identification** function.

- **Macrovision**[1]

Macrovision is an analogue video copy protection system. It distorts the quality of analogue recordings, rendering the recordings useless from a commercial point of view. Macrovision works due to the differences in the way VCRs and televisions operate. The automatic gain control (AGC) circuits within a television are designed to respond slowly to change; those for a VCR are designed to respond quickly to change. The Macrovision technique attempts to take advantage of this by modifying the video signal so that a television will still display it properly, yet a VCR will not record a viewable picture.

This technology is relatively old and it is possible to purchase DVD or VHS video equipment **with the MacroVision system disabled**.

- **Content Scrambling System (CSS)**[2]

This system relies on a combination of content **scrambling**, key encryption and conditional access. DeCSS is an executable binary utility, written for Microsoft Windows. When you execute this program it displays a simple dialog box and two buttons. These buttons are labelled "Select Folder" and "Transfer". One button reads CSS-scrambled content from a DVD-ROM, and the other deposits unscrambled MPEG-2 video files to the user's hard drive.

CSS uses a 40-bit key, which means that it is rather weak. Even if the scrambling algorithm is well-designed, the short key length means that a brute-force search will quickly find the key.

The CSS system is alleged to have been cracked for the first time in September 1999. In November 1999, an analysis of the "CSS decryption" source code and the underlying CSS algorithm revealed serious weaknesses which made it possible to defeat CSS without a player key.

Almost immediately after the CSS reverse engineering was complete, the DVD-CCA and the MPAA began sending threatening letters to the owners of websites offering CSS decryption

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1 www.macrovision.com/

2 http://www.wyvern.org/decss/dvd-discuss-faq.html

programs for download. These letters successfully intimidated some web sites into removing the programs. Similar letters are still being sent today.

- **Watermarking**

Watermarking is an **identification** technique, which can guarantee the integrity and authenticity of digital content. It allows the protection system to be incorporated for the first time into the "fabric" of the content, rather than being added on as separate information. If, for example, a DVD is copied, the watermark follows the copy, no matter how the copying occurred. Expert knowledge and considerable computer power are required to remove the watermark: it must be removed from each frame of the entire video. When the DVD player detects the watermark on the copy, it refuses to play it and ejects the disc. The player will recognise that the video is on a recordable DVD (which is illegal) because the watermark technology is reinforced with a "**wobble**". The wobble is a unique number pressed into the plastic of the DVD disc. It is coded to match the watermark. The system actually introduces a "**tattoo**" into the film and a "tattoo" into the disc. These "tattoos" have to match – if they do not, or if one of them is absent, this means that an illegal copy has been made, which the player will refuse to play. The watermark/wobble system can be tailored to allow one generation private copies but block any copying from those copies.

- **"Black Boxes"**

These devices are at the user end, and provide the ability to interface with the tattooed information and manage it in view of ensuring lawful usage. Most of this functional aspect still needs to be agreed and designed to ensure global interoperability and avoid the multiplication of proprietary systems.

(b) Examples of DRM Schemes[3]

There are numerous companies currently offering DRM processes to rightholders. Here is a non-exhaustive list of some of the more well-known schemes:

- **The Secure Digital Music Initiative (SDMI)[4]**

SDMI is a group whose goal is to "protect the playing, storing, and distributing of digital music". SDMI is attempting to curb piracy using technological means.

SDMI is developing specifications for a system, to be enforced by future music players/recorders, to hinder unauthorized copying by screening music. In a nutshell, music will be protected with various technologies (such as digital watermarking. Devices that play or record music will first screen it, and protected music clips will only be playable under certain conditions. For instance, with this system, you could buy a CD at a record store that contains protected music. You would be able to play the CD in an SDMI-compliant CD player. However, if you take a song from the CD, compress it into an MP3, and make it available on the Internet, those who download the MP3 will have trouble playing it on an SDMI-compliant device.

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3 Elements of this survey have been drawn from a study conducted by Rightscom Ltd. on behalf of Hewlett Packard.

4 http://www.cs.princeton.edu/sip/sdmi/faq.html#A1 and www.sdmi.org

On September 6, 2000, SDMI issued "An Open Letter to the Digital Community," inviting people to attempt to crack certain technologies they are considering for use in their system: "**the SDMI Challenge**". They set up a web site where music samples and some other information could be downloaded to aid in analyzing the technologies. The SDMI requested that participants send the results of their watermark removal tools along with technical details of how the watermarks were removed. Following this, the SDMI would then offer participants the chance to sign a non-disclosure agreement in return for receiving a fraction of the prize money.

- **Microsoft Digital Asset Server (DAS)**[5]

The system (part of Microsoft's "eBooks initiative) is client server based, with one piece of software residing on the users computer, the other an Internet server at the merchant site. The client software is Microsoft reader, which enables the user to download books at various levels of security. By logging on to the merchant's site, users are able to purchase newly published books. Once the purchase has been made, users receive the books into their Microsoft Reader software. Publishers can set the **usage rules**. At the moment, rules can be set to prevent the user passing on the book to more than one other computer (this restriction enables the user to make a backup of the book, similar to the permission granted by a software licence).

- **IBM Electronic Media Management System**[6]

The Electronic Media Management System (EMMS) from IBM is an e-commerce software solution for digital distribution of media. The suite of five software products builds a technical platform with tools and security features that enable content owners and market intermediaries to conduct e-commerce and deliver electronic media content over various types of digital transmission systems. EMMS technology is being widely adopted within the industry. Many companies active in the delivery of digital music have already adopted or are supporting the EMMS technology. They include Liquid Audio, Reciprocal, RealNetworks, BMG Entertainment and Sony Music Entertainment Japan.

- **InterTrust**[7]

InterTrust has developed a general purpose digital rights management system for providers of digital information, technology and commerce services.

The core element in the InterTrust system is the InterRights point. Each InterRights Point acts as a secure "virtual machine" on a PC or consumer device, with the ability to manage digital rights remotely. At each InterRights Point, a secure database is created which stores the user's rights, identities, transactions, budgets and encryption keys. The other part of the system is the **Digibox**, a secure container in which protected information is stored in an encrypted state. This ensures that the content of whatever media type can be secured from abuse. A Digibox can only be opened by an InterRights Point that satisfies the required rules as contained in the Digibox. Rules can be set by rightholders and include rules concerning payment, viewing and playing and copying and printing.

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5 www.microsoft.com/reader/das/default.htm
6 www-4.ibm.com/software/is/emms/
7 www.intertrust.com

An interesting feature of the InterTrust system is its ability to enable peer to peer distribution, such as the formerly infringing services such as Napster. InterTrust technology should now make it possible for content owners to enable legitimate peer to peer consumer activity without the risk of massive infringement.

A group of companies has already signed up with InterTrust, including Adobe, Magex, Mitsubushi, Reciprocal and PricewaterHouseCoopers. There is also an initiative with AOL for the secure downloading of music to its members.

- **Liquid Audio**[8]

The Liquid software, which supports many digital music formats, including MP3, comprises two parts: the sound recording mastering software, called Liquifier Pro, and the download server, called the Liquid Server, which allows consumers to gain access to the tracks mastered in Liquifier Pro.

The owner of a sound recording wishing to encode material in the Liquid Audio system can use the Liquifier Pro software to encode the music in one of a number of formats. The Liquifier Pro embeds into the encoded file an inaudible **digital watermark**, which enables tracking of the music. Additional security is provided by encryption software that can tie a downloaded sound recording uniquely to a consumer's Liquid Audio Player. Once encoded by the Liquifier Pro software, the music is made available to consumers via the Liquid Server. If the consumer wishes to purchase, a transaction is undertaken, usually with a credit card via a merchant service, and the actual sound file is downloaded to the consumer device. It is also possible to set some usage rules, such as number of days a promotional track can be played and to allow or prevent CD burning.

Currently, some 66 record labels have signed up with Liquid Audio. The company is also an online partner for BMG Entertainment, part of the Bertelsmann Group.

- **ContentGuard**[9]

ContentGuard is 80% owned by Xerox and 20% by Microsoft. The ContentGuard system enables rightholders to specify rights, terms and conditions for use and then provides an encrypted envelope in which to store the content. One of the product offerings from ContentGuard is XrML (see above).

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8 www.liquidaudio.com
9 www.contentguard.com

- **Info2Clear**[10]

This Belgian company has set up a DRM system, targeted initially at the newspaper industry. The company's DRM system is based on two sets of software processes. GetaSeal is a process by which clients can protect their intellectual property against infringement by the creation of a timestamp and trusted seal by registering the content on the Info2Clear web site. The use of a secured web interface, including a batch process enabling the registration of large quantities of material simultaneously, is based on Public Key Infrastructure (PKI) encryption technology to ensure total reliability and security.

Once a rights owner's content has been registered on the Info2Clear site with GetaSeal, the content can then be made available for download through the GetaCopy service. A user visits the content owner's site, where a database of available material is located. Having selected the article or articles required and purchased the necessary copyright permissions (which will be based on the number of copies required), the user is taken to the Info2Clear site, which is co-branded with the content owner. Payment is effected through either an account based process or by credit card, and the required content is now available for download to the user's client in a variety of formats. The content is not heavily encrypted but is accompanied by an Info2Clear encrypted seal. This seal contains and encrypted signature which will always appear with the content. According to Info2Clear, it is not possible to remove the seal without damaging the content file itself. This enables the acquirer of the content to display it without the end-user requiring any special reader software. However, should the acquirer pass on the content without permission, it would be clear, by searching the web, that the content has been passed on without permission.

- **TV Anytime**

This global consortium is specifying technologies, standards and business models to support personal video recorders based on hard disk technologies. An essential part of its work is how to address the copyright implications of this new technology, which offers a "store and forward" approach to digital content within the home. It has published a call for technologies to fulfil rights management and protection (RMP) requirements defined by members. This covers (1) appropriate service and application APIs, capable of interacting either with TV Anytime's baseline RMP system or proprietary RMP systems, and independent of any proprietary API middleware platforms; and (2) a baseline RMP device interface, addressing the protection of different types of data: RMP information data, metadata, the content itself and the secure authenticated channel used to establish trust and transmit keys.

www.tv-anytime.org

Per TV Anytime documentation, the basic premises for the proposed RMP system are:

> to provide ownership information and usage rules
>
> to persistently protect the integrity of such rights information and content and usage rules
>
> to persistently enforce those usage rules.

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10 www.info2clear.com

The overall RMP system must respect:

> The consumer's use rights (e.g no improper fees levied) according to applicable regulation
>
> Basic consumer legal rights or interests (e.g personal copy privileges, privacy protection) according to applicable regulation

- **Digital Video Broadcasting Group**

The Digital Video Broadcasting Project (DVB) is an industry-led consortium of over 300 broadcasters, manufacturers, network operators, software developers, regulatory bodies and others in over 35 countries committed to designing global standards for the delivery of digital television and data services. In September 1999 the DVB established a new sub-group, DVB-CP (Copy Protection) of its Commercial Module with a mandate to prepare a commercial requirements document for copy protection. The purpose of that document is to act as a basis for the production of technical specifications by the corresponding group of the DVB Technical Module (DVB-CPT).

The scope of the envisaged DVB Copy Protection and Content Management (CPCM) system is end-to-end protection for content in all processes from the point of initial distribution to the end user through to the point of viewing or listening by the end user. It is intended that the DVB-CPCM shall be applicable to the widest possible range of equipment and not just restricted to DVB-specified systems. This encompasses in-home digital networks and personal video recorder technologies and all digital delivery mechanisms including terrestrial, satellite, cable, and the Internet. The authorised usage of content protected by the DVB-CPCM system shall be described by "Usage State" information which is tightly bound to the content. It is also a requirement that the DVB-CPCM system shall support a means of indicating whether protected content may be moved for viewing/listening outside the "Authorised Domain". The latter means the devices, networks and interfaces which are used primarily by the authorised user both inside and outside the home and are owned/rented by that user. The DVB's commercial requirements for CPCM were finalised in March 2001 and passed to the DVB-CPT technical group as a basis for a call for proposals (CfP). The latter was issued in July 2001 with a deadline for submissions of 19 October 2001. Twenty four proposals were received in response to the CfP and these are currently being evaluated.

www.dvb.org

- **Specific technologies for DRM in digital television and video**

Further details of specific DRM technologies for digital television and video can be found at the following URLs.

5C - http://www.dtcp.com/

HDCP - http://www.digital-cp.com/

CPTWG - http://www.cptwg.org/

DVD CCA - http://www.dvdcca.org/

ANNEX II

Inventory List

of Digital Rights Management projects financed by the Research Programmes of DG Information Society

PART ONE : Overview

This list should give a complete *overview of projects financed by the Research Programs* of DG Information Society (respectively its predecessors) in the area of **copyright protection in the digital environment**. Projects in this area were supported within the Framework programs (FP2 to FP5) and in the context of INFO 2000. There are projects envisaged within the eContent programme and FP6, but they are not launched yet.

The aim of these **projects starting already in 1990** was and is to find out whether copyright protection in the new digital environment could be facilitated and guaranteed by electronical or technical measures. There are **23 projects all together** in the list. Most of the projects are finished all ready; only five projects in the context of FP5 are still running or about to be started.

41.134.593 Euro were spent on the 13 projects within the framework programs FP2 – FP5 **(total costs)** while the EU-contribution amounts to **24.169.941 Euro (funding)**. The INFO 2000 projects on MultiMedia Rights Clearing Systems **total cost was 5.5 million Euro**, whereby **2.2 million Euro** were **contributed by the EU**. The average funding per project was 250.000 Euro.

From the point of view of the content the projects can be subdivided in five groups:

(1) Projects with the **aim to design a new management system** to protect copyright in the digital era using technical measures in the context of a sophisticated methodology (9 *"Management-Projects"* + RITMO, which is to be stopped)

(2) Projects envisaging certain **building blocks** (e.g. watermarking, interoperability) **of such a management system** (3 *"Detail-Projects"*)

(3) Projects envisaging the **creation of certain "centers"** (e.g. databases, platforms, information systems, portals) **to control the usage of content on the Internet** (6 *"Center-Projects"*)

(4) Projects **promoting the idea of digital rights management systems** (2 "Promotion-Projects")

(5) Other projects (2)

1. "Management-Projects"

Starting off with the **CITED project** in 1990,

the aim was and is to create a generic model applicable to the different business domains using technical means to provide control, policing and remuneration, in respect of the use of copyrighted material stored and transmitted in digital form.

COPYCAT (1993) continued this work trying to develop an "electronic copyright protection system".

In **1995** a new project called **COPYARMS** followed the idea by trying to develop a so-called "IPR ECMS" (Electronic Copyright Management Systems) by focussing on the *standardisation of technical measures* which is necessary to permit the *interoperability of systems*.

At the same time **COPYSMART** should help designing an industrial low-cost solution for *implementing hardware and software building blocks for IPR management in multimedia applications*.

Also in **1995** the **IMPRIMATUR** project was to establish a so-called Multimedia Rights Clearance in networks. The key issue was to agree, within a forum representing a wide range of information industry organisations, on an *interface between IT, telecommunications and IPRs (standardisation)* and *to identify and develop a set of tools* to address those problems in the business.

The **ARGOS** project in **1998** also followed the idea of developing a copyright management system around a so-called "ARGOS center" concentrating on the *establishment of a standard Communication Protocol* for the flow of information between the parties.

The **E-Cluster project (1998)** wanted to *create a cluster of ESPRIT, ACTS, TELEMATICS APPLICATIONS and other* (national, US, Japanese…) *projects* concerned with E-Commerce and IPR management ; at the same time the operation of interoperable systems (protection of the information against piracy, secure payment) and the promotion of IPR management systems was intended.

The **CREA NET project (1999)** aimed to create a collaborative and secure environment for *authors and producers* where they could collaborate in pre-development and development business stages, co-production and world-wide pre-sale regarding European titles of *films, TV programs and media-rich interactive works*.

The **OCCAM** project **(2000-2001)** is the latest project in that context addressing the problem of open architectures and interfaces for on-line access to digital content with IPR protection and management. The activity concentrates on *developing interoperable enabling tools and components for the controlled access, delivery and consumption (IPR) of multimedia information over networks* (e.g. by prototype applications). Furthermore it wants to establish a number of *commercially-driven applications* utilising the aforementioned tools and to point out additional actions needed for subsequent full and successful commercial exploitation.

To sum up, the idea of an effective management of the IPR for all parties in the e-commerce field with secure ways of dissemination and marketing of copyright protected works in digital format was followed by 9 projects. The projects concentrated on the development of a technical infrastructure that can provide effective monitoring tools and assure a fair remuneration for the use of copyright protected works.

2. "Detail-Projects"

To support the "management projects" three projects were set up concentrating on the development of building blocks of a management system:

FILIGRANE (1998) checked the *reliability in software components and in the off-shelf components* (i.e. origin, integrity, rights to use) and also wanted to develop new fee collecting mechanisms. The idea behind it was to produce a framework from specifications to operational implementation.

CERTIMARK (2000) focussed on *water-marking technologies* (benchmarking, application scenarios) aiming to *create a reference tool* for technology suppliers and customers (limited to the protection of still pictures and low bit rate video over the Internet).

INDECS (INFO 2000) was to create *interoperability* of digital content identification systems and rights metadata within multimedia e-commerce.

3. "Centre-Projects"

Other projects try/ tried to establish certain "centers" (e.g. databases, platforms, information systems, portals) to control the usage of content on the Internet sector by sector.

RIGHTSWATCH (to be announced) wants *to establish* a financially secure *institution* which will facilitate a pan-European self-regulatory procedure for the *removal of infringing intellectual property* (known as *Notice and Take down*). The practical focus of the project is to develop a website with a hotline that will allow rights-holders to identify infringement, notify that infringement and have the material removed.

VERDI (INFSO 2000) tried *networking of existing* collectively *managed multimedia rights clearance systems* in six Member States to develop an overall concept and platform for an integrated *online licensing system.*

EFRIS (INFSO 2000) managed to set up *a sector specific multimedia rights clearance system for book publishing.* The result is an all-year round web-based interactive rights information system enabling participants to update their own rights information and to contact other rightholders directly (in collaboration with the Frankfurt Book Fair).

TV Files (INFO 2000) wanted to create a service *centre that provides* European TV programme buyers and multimedia producers with *all the decision making data* they need to evaluate international productions, including intellectual property rights (IPR) and programme information. The aim is to shorten substantially the research time needed to evaluate content, quality and ownership and giving rightholders, television producers and distributors access to hundreds of buyers.

PRISAM (INFO 2000) is an *information system* to speed and simplify negotiations between European producers and editors of *multimedia products (audiovisual works*) on the one hand and rightholders on the other. Copyright is administered by four participating organisations.

ORS (INFO 2000) is an *internet portal providing* fast *access to* the many *different companies holding information on rightholders, management modules and music-related rightholder organisations* throughout Europe. The portal has an interfaced standard database structure and management modules enable the user to make his searches according to a wide range of criteria .

4. "Promotion-Projects"

Two projects try explicitly to promote the idea of Electronic Copyright Management.

TRADEXs' (2000) aim is to *assess solutions resulting from recent research activities on digital object exchange* and to *deploy the results* of European research *in the field of electronic treatment of IPR*. *Assessment* will give indicators of the technical performance and the business service impact.

COMPAS (INFO 2000) is a *multi-lingual web-based information service* for multimedia service companies, production agencies, training organisations, publishers and rightholders. It is designed to handle frequently encountered problems in rights clearance (e.g. copyright issues; procedure and operations).

5. Other Projects

b© - before copyright (INFSO 2000) is a networked agency dedicated to multimedia content development for European co-productions. *b© provides a trusted environment to create new content*: collaboration and rights trading, allowing different individuals to work together to develop multimedia, while protecting each intellectual contribution. b© technology is based on original software, known as the Notary System, combined with a set of exclusive tools for multimedia content development.

BONA FIDE (INFSO 2000) aims to develop a secure environment which enables rightholders to store and distribute multimedia content and allows usage to be monitored. A so-called broker architecture on a website should enable producers and end users to search for acquire and pay for suitable content. Using the website one is obliged to use model legal contracts, but at the same time it handles licensing and monitoring of the system content beginning with unique identification of each multimedia object.

PART TWO: Detailed Inventory of EC DRM Projects

The inventory below attempts to provide an exhaustive list of EC funded projects related to DRMs. The list provides a more detailed description of each project, the functioning of the technique, the costs, etc.

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1. Projects In the context of FP 2 & 3 (completed programmes)

1.1. ESPRIT Project 5469 – Copyright in Transmitted Electronic Documents (CITED)/ start: 1990, duration: 40 months

- **EU-contribution (Funding):** 2.65 Mio. Euro / total costs: 5.3 Mio. Euro).

- **Description:** The CITED project had as its main goal the demonstration of viable technical means to provide control, policing and remuneration, in respect of the use of copyrighted material stored and transmitted in digital form. CITED delivered *software tools* to be included into existing application *in order to monitor* in a proper way *copyright and other associated rights* in a full independence with the national regulations and commercial practices. The **objective** is to safeguard copyright material stored and transmitted in digital form.

- **Functioning:** CITED built a *generic model applicable to the different business domains*. The model considers that copyright protection has to integrate the information actor chain as a whole, to protect primary as well as the secondary (ie catalogue) information, to secure mass production processes (info masters), to be as transparent as possible with the existing processes, to be applicable in any EC country in conformity with national copyright legislation, and to be sufficiently flexible regarding the business strategies of the information makers and users. The model is defining distributed components that will be transparently located at the user level, at the information system level and wherever there is a relationship among the users, the distribution system and the information system. It provides countermeasures to various piracy.

- **Results:** The model was implemented and tested for *two demonstrators*, which will embody the distributed components in specified environments within the information industry. Implementation has been carried out *for computer based systems* (CD-ROM, Online base, etc.) *and five software tools for PCs* have been realised. The first one is the Event Capture Tool (ECT) which handle all the user and hardware events. The Use Right Collector (URC) collects and manages the use right data base and link the data with their associated rights. The Clearance Service Agent (CSA) clear the incoming events with the use right base. Finally the Notarisator create the audit trail file to log all the cleared events and threads. These software tools are transferable to other projects. The first demonstrator is based on an online system for supplying downloaded document images from a digital store (ADONIS); the second demonstrator is being developed in the field of digital audio recording (DAT).

1.2 ESPRIT Project 8195 – Copyright Ownership Protection in Computer Assisted Training (COPICAT)/ start: 1993, duration: 28 months

- **EU-contribution (Funding):** 1.51 Mio. Euro / total costs: 3.2 Mio. Euro).

- **Description:** The COPICAT project addressed the area of <u>electronic copyright protection</u>. It aimed to provide a basis for confidence in electronic copyright protection and open up a "blocked" market in multimedia electronic publishing. COPICAT wanted to <u>develop a generic architectural model for an electronic</u>

copyright protection system incorporating the copyright-related event management model from the CITED project (ESPRIT 5469).

- **Functioning:** A complex ownership and access structure was simulated. The COPICAT system was installed and tested on a pilot site. A validation workpackage provided independent assurance of the effectiveness and correctness. The models were subjected to *controlled and audited hostile attack by IT-experienced students*. The project had strategic links to major players in the information technology and publishing industries who had given undertakings to provide exploitation paths into their respective sectors.

- **Results:** The project results should have been promoted actively and by all means in order to establish the results as the core of a 'de-facto' international copyright protection standard in conjunction with the promotion activities already initiated by the CITED project.

2. Projects In the Context of FP 4 (Ended Programs)

2.1 ESPRIT Project 20460 – Co-ordinating Project for Electronic Authors Right Management Systems (COPEARMS) /start:1995,duration: 36 months

- **EU-contribution (Funding):** 1.2 Mio. Euro / total costs: 2.280.300 Euro).

- **Description:** supposed to assist the so-called "vertical projects" concerned with IPR management to take advantage of the experience of the earlier CITED-project and thereby develop and implement interoperable IPR ECMS (Electronic Copyright Management Systems). A related **objective** is to carry out with the vertical projects a standardisation process that is necessary to permit ECMS interoperability. Objectives should be met through the following processes: (1) *identification and feasibility study* of co-ordination with the concerned vertical projects, analysis of their business case, (2) *transfer of the CITED technical expertise* and *of existing technology* for rapid implementation, maintenance and upgrade of the CITED model, (3) *examination of legal IPR issues*, (4) preparation of *pre-standards in the area of IPR identifiers and EDI/ECMS messages*, (5) organisation of *ECMS proficiency centres* and of ECMS technology and *standards* SIGs (Special Interest Groups) and workshops in Europe.

2.2 ESPRIT Project 20517 – CITED based multimedia IPR management on cost effective smart device (COPYSMART)/ start: 1995, duration:24 months

- **EU-contribution (Funding):** 1.6 Mio. Euro / total costs: 3.065.600 Euro).

- **Description:** The CopySmart project aimed at the development of an industrial low-cost solution for implementing IPR management based on the CITED model. CopySmart wanted to build on existing technologies: CITED, a global IPR management model developed in a previous ESPRIT project, security technology from the Smart Card market, and standard interfaces for portable hardware, the PCMCIA. CopySmart *targeted the PC environment* and should provide within short term the hardware and software building blocks for implementing IPR management in multimedia applications. Respect of standards is a key issue for large market acceptance. *Cryptographic algorithms and payment functions* should reside in the CopySmart device in a removable security module. User partners

should implement pilots in key applications of the PC sector: tele-training, a network application with CopySmart protected course ware material, a library CD-ROM application, demonstrating CITED payment features, a corporate information application, with all CopySmart features, including TTP.

2.3 ESPRIT Project 20676 – Intellectual Multimedia Property Rights Model and Terminology for Universal Reference (IMPRIMATUR)/ start: 1995, duration: 36 months

- www.imprimatur.alcs.co.uk

- **EU-contribution (Funding):** 4 Mio. Euro / total costs: 7.281.200 Euro).

- **Description:** established to study the challenge of Multimedia Rights Clearance in networks. The IMPRIMATUR consortium brings together European and American participants in a major programme of information gathering, systems proving and consensus building.

- **Project Goal:** To agree, within a forum representing the widest range of information industry organisations, a swift and practical response based on a mutual understanding of the problems arising at the interface between IT, telecommunications and IPRs and to identify and develop a set of tools to address those problems in the business, technological, standards and legal areas.

- **Functioning:** The IMPRIMATUR project designed a methodology for a series of Special Interest Groups in the Business, Legal, Technical and Standards areas to solicit opinion from a very wide range of players in the Information Society. The *consensus building process* was further enhanced by a series of major international conferences (consensus building). Imprimatur is an open, internet accessible system implemented on a multimedia server located at the University of Florence and embodies a business model based on current practice in the light of the consensus-building process.

2.4 ESPRIT Project 26984 - ARGOS Centre Project for IPR Data Collection and Management (ARGOS)/ start: 1998, duration: 24 months

- www.argoscentre.com

- EU-contribution (Funding): 700.000 Euro / total costs: 1.4 Mio. Euro).

- **Description:** The overall *objectives* of the ARGOS Centre Project were as follows: (1) To assure an *effective management of the Intellectual Property Rights* for all parties involved in the Electronic Commerce field, (2) To provide the rightholders with *secure ways of dissemination and marketing of cultural works in digital format*, (3) To improve the *access to electronic distribution services* of cultural works over both public and private networks. These objectives can be achieved if the individual rightholders and Collecting Societies can count on a technical infrastructure that can provide them with effective monitoring tools and assure them a fair remuneration for the use of their works.

- **Functioning:** The technical infrastructure is the ARGOS Centre, which addressed the following technical objectives: (1) To develop a state-of-the-art management

system to process all the information related to the use of copyrighted works in electronic formats and to improve the communication between the entities using these works electronically and the individual rightholders and authors right societies, (2) To establish a standard Communication Protocol for the flow of information between the parties involved in the Electronic Commerce of copyrighted works. This was the core of the ARGOS Centre Project and its main technological risk. **Following phases**: **Specification Phase** (technical and content specifications, guidelines for establishing a limited number of pilots ARGOS Centres); **Design and Implementation Phase** (design and prototyping of the ARGOS User Interfaces, the ARGOS Converters and the ARGOS Communication Protocol); **Validation Phase** (operational phase of the pilot ARGOS Centres, quality control activity of the functionality and interoperability of the system); **Dissemination and Business Plan Phase** (development of a complete framework and methodology for the dissemination and marketing of the economically exploitable outcomes).

2.5 Esprit Project 28423 – Flexible IPR for software agent reliance (FILIGRANE)/ start: 1998, duration: 24 months

- **EU-contribution (Funding):** 1.2 Mio. Euro / total costs: 2.221.700 Euro).

- **Description:** faced the problem of *authors' rights protection and piracy prevention caused by the outgrowth of Applets, JavaBeans or ActiveX* (main difficulties: identification of initial authors and the management of the property rights on a global network). Security issues involved: (1) reliability in software components and in off-the-shelf components (i.e. origin, integrity, rights to use); (2) IPR protection and management: new fee collecting mechanisms and potential abuse detection.

- **Functioning :** FILIGRANE should produce a *framework*, from specifications to operational implementation, of a high level regulation mechanism answering to the increasing demand for software components trusted exchanges in the Information Society. Issues addressed in FILIGRANE encompassed : (1) mobile software IPRs guaranteeing to the rightholders the proper use of their production, (2) security mechanisms authenticating the mobile software origin and the authorised user, certifying software integrity, (3) secure protocol for software downloading from server to user support (PC, NC or smart card - namely, a JavaCard). It integrated several key components: **Software component registration** (registration of the software component by the component provider is performed to a registration authority acting as a trusted third party; enables software component identification and authentication); **Content protection** (software components protection to ensure software components integrity); **Components circulation protection** (security protocols through a public key infrastructure shall be integrated and will interoperate with a JavaCard) and **IPR Management/ERMS** (manages IPRs for the component provider; a Registration Authority can track software authentication requests allowing the provider to identify and measure component usage). FILIGRANE ‘s was to propose a secure system for mobile software trading and developing solutions for software component authentication and integrity.

2.6 Esprit Project 29430 – Electronic Commerce Cluster (E-Cluster) / start : 1998, duration: 12 months

- EU-contribution (Funding): 76.700 Euro / total costs: 76.700 Euro).

- **Description:** The overall objective of E-CCLUSTER was to promote the progress of the Electronic Commerce of intangible goods to which rights are associated. This progress involves : (1) the operation of interoperable systems (protection of the information against piracy, secure payment) ; (2) the promotion of and increased awareness about EC and other projects concerned with E-Commerce and IPR management.

- **Functionning:** The project was to carry out three activities: (1) the creation of a cluster of ESPRIT, ACTS, TELEMATICS APPLICATIONS and other (national, US, Japanese…) projects concerned with E-Commerce and IPR management, (2) the operation of the cluster in particular through three thematic workshops and other consensus building activities, (3) awareness, promotion and dissemination activities, including web-related ones. After this first stage of the project, consensus was to be reached among the interested participants in the areas of technologies/ standards/ products & services/ electronic payment models and market requirements and economic models of users.

There is a further project in the context of FP4 called **VIVA** in cooperation with Philips (for further informations contact Philippe Lefebvre).

3. Projects In the Context of FP 5

3.1 IST-1999-10639 – Rightswatch (RIGHTSWATCH) / start: to be announced, duration: 24 months

- EU-contribution (Funding): 1.3 Mio. Euro / total costs: 1.3 Mio. Euro).

- **Objective:** RightsWatch aim is to build on the common interests of the Intermediaries and the Rights-holders to provide a safe environment for trade in works protected by IPR. The primary objective was a fully functioning, financially secure institution which will facilitate a pan-European self-regulatory procedure for the removal of infringing intellectual property (known as *Notice and Take down*). Within this objective, the project should identify all the practical, economic, social and legal issues that will determine its success and will tackle them with the relevant agencies.

- **Description:** The practical focus of the project is to develop a RightsWatch prototype: a website with a hotline that will allow rights-holders to identify infringement, notify that infringement and have the material removed. This should include: (1) The design of a set of consensual rules, that address legitimate concerns of rights-holders and intermediaries; (2) the setting-up of an affiliate partners network representing the various communities of interest; (3) the encouragement of technical solutions facilitating RightsWatch in areas such as rights metadata, watermarking and electronic payments (e.g. identification of basic technology for possible technical benchmarking, including standards, scalability and levels of interoperability) and (4) investigation for the use of intelligent agents in electronic rights management to facilitate the automation of the RightsWatch process.

- **Result:** As a result, the project should make a first step toward developing trust and confidence between rights-holders and intermediaries by setting up an agreed and reliable notice and takedown procedure.

3.2 IST-1999-10871 – Creative's rights European agency network (CREA NET) / start: 1 January 2000, duration: 30 months

- www.creativesrights.com

- EU-contribution (Funding): 1.2 Mio. Euro / total costs: 2.338.832 Euro).

- **Objective:** creation of a collaborative and secure environment for authors and producers where they could collaborate in pre-development and development business stages, co-production and world-wide pre-sale regarding European titles of **films, TV programs and media-rich interactive works**.

- **Description:** This environment shall consist in a network (CREA Net) of local centres accessible at regional or national level called "CREA Centres". Thus CREA Net will combine localised process support for complying with local laws, regulations and uses, thus providing confidence in the local context. The system shall provide proximity services (CREA Centre level) and an international distributed hub process support that will give the basis for international collaboration and co-production with a consistent visibility of the CREA Net image world-wide (CREA Net level).

- **Functioning:** The aim is to design and implement a flexible framework allowing the construction of a common rule based trusted environment for both individual CREA Centres and for the CREA Net hub. The security and trust services will be managed by a *Transaction Manager Agent,* which according to each transaction's context and to a set of operational rules will invoke the relevant services and thus will guarantee the rights of all actors involved in the transaction. Each CREA Centre will be equipped with such an agent allowing them to implement specific rules compatible with their national context. Around the Transaction Manager Agent, *collaborative services* will be also defined within the project, namely: (1) the *IPR Manager Agent* (trusted third party to handle all IPR related aspects of transactions; responsibilities: rights tracking, depositing and transaction notarisation); (2) the *Co-Prod Connector* (will provide a contextual user interface); (3) the *Brainstormer* (allowing secure on line interaction and collaboration across national borders) and (4) the *UpStream Marketer* (will deploy mixed dissemination mechanisms to feed information about titles in development to international distribution channels).

3.3 IST-1999-10987 – Certification for watermarking techniques (CERTIMARK) / start: 1 May 2000, duration: 27 months

- www.certimark.org

- EU-contribution (Funding): 3.4 Mio. Euro / total costs: 5.140.903 Euro).

- **Objectives:** (1) To design, develop and publish a complete benchmark suite for watermarking technologies within promising application scenarios; (2) to make this benchmark suite a reference tool for technology suppliers and for technology

customer; (3) to set up a certification process for watermarking algorithms; (4) to bring the European technological offer in a leading role for protecting pictures in the context of E-commerce over the Internet. The project will **concentrate** its work **on the protection of still pictures** and **low bit rate video** over the Internet.

- **Description:** The project is articulated around six workpackages: **WP 1:** management of the project; **WP 2** will define a set of quantitative measurements and validation mechanisms that will be applied to rate different watermarking algorithms for specific set of pre-defined applications; **WP 3:** designing and developing an international benchmarking platform for evaluation and certification of watermarking algorithms. Interfaces will be specified so that any algorithm can be easily plugged into the platform for evaluation; **WP 4** will address research on attacks and manipulations, execution of the benchmark and pre-certification of the algorithms; **WP 5** will create a European technical Task Force on watermarking techniques (should undertake consensual basic research in complex watermarking issues); **WP 6:** procedure for watermarking algorithm in view of specifying profiles for future watermarking.

3.4 IST-1999-21031 – Trial Action for Digital Object Exchange (TRADEX) /start: 1 October 2000, duration: 16 months

- EU-contribution (Funding): 700.000. Euro / total costs: 1.373.417 Mio. Euro).

- **Objective:** is to set up a trial for assessing solutions resulting from recent research activities on digital object exchange, with the aims of enhancing the marketing of tradable multimedia related to cultural heritage (e.g. international co-operation for the establishment of a world-wide common working platform (Japanese actors are involved), deploy the results of European research in the field of electronic treatment of IPR, foster the penetration of methodologies and technologies towards cultural institutions and governments, contribute to create a critical mass of buyers and sellers.

- **Description:** TRADEX restricts the trial domain to the on-line multimedia object transfer. At technological level, it will first consider *available copyright marking technologies for solving the illegal copying and proof of ownership* problems in the context of multimedia objects (focus on the convergence on common criteria for: content fidelity preservation, robustness to attack, applicability to audio, image, and video data, including synthetic objects).. Thanks to the involvement of Smart Card producer, new-generation smart card technologies will be integrated and tested. MPEG-4 compliant tools will be deployed in the trial in order to test some Intellectual Property Management & Protection (IPMP) methods. Assessment will give indicators of the technical performance and the business service impact. The agreement between Regional Government of Tuscany (Italy) and the Prefecture of Gifu (Japan), will be the building block to implement the international co-operation of TRADEX. For each type of participants there will be representatives both from Europe and from Japan. Primary market and technological leaders are involved in TRADEX activities.

3.5 IST-1999-11443: OCCAM – Open Components for Controlled Access to Multimedia Material (Start Date: 2000-01-01 End Date: 2001-12-31)

- EU-contribution (Funding): 2.892.243 Euro / total costs: 5.633.241 Euro).

- **Objective:** The project addresses the problem of open architectures and interfaces for on-line access to digital content with IPR protection and management. Trials will be conducted with this facility, involving real end-users both in the home and in schools, to validate innovative business models for the benefit of market operators.

- **Description:** The activity concentrates on developing enabling tools and components for the controlled access, delivery and consumption (IPR) of multimedia information over networks, as well as setting up prototype applications and services based on the selected technologies to prove their effectiveness. To that end, a test platform will be constructed which will incorporate state-of-the-art content protection tools into a secure infrastructure compliant to the specification of international standard bodies (OPIMA, SDMI, MPEG). Furthermore OCCAM wants to establish a number of commercially-driven applications utilising the aforementioned tools, which will deliver the needs of all participants in the above business and to define and monitor performance levels in trial environments for such applications, and to point out additional actions needed for subsequent full and successful commercial exploitation. At a final stage, OCCAM should be able to manage the full range of digital content types, based on most promising technological frameworks such as MPEG-4.

4. IST-2000-26047 – RESEARCH ON INTEGRATED TRADING MODEL FOR MUSIC ON-line (RITMO) / start: January 2001/ duration: 18 months (is going to be stopped)

- EU-contribution (Funding): 1.5 Mio. Euro / total costs: 1.5 Mio. Euro).

- **Objective:** RITMO addresses challenges currently faced by the independent **music industry** in Europe in relation to 'Technology Building Blocks for Trust and Security', as well as 'Access to Digital Collections of Cultural Content'. There is uncertainty on standards and no clear vision as to how a global infrastructure for distribution, rights management, royalty collection and payment will evolve. This action shall *clearly identify the technology* needs of the independent music industry. It shall lead to the development of *models for on-line music distribution*. It will pave the way for open, accessible platforms by which the independent music of Europe can be distributed to the markets of the world. **Aim:** Carry out a *comparative legal analysis of music distribution contracts* in Europe; *elaborate* experimental *model contracts* for European on-line music distribution; clarify *technology solutions for rights management*, *royalty collection and payment* in relation to on-line music distribution; Develop *business models for on-line distribution* suitable for adoption by SMEs and *globalisation strategies* for the technology driven development of the European independent music industry. *Disseminate these results* to the independent music industry, to researchers and to the developers of technologies for on-line music distribution, to intermediaries and third parties such as collection societies and the providers of infrastructures for trust and confidence brokerage.

- **Description/ main activities:** (1) Administration and co-ordination activities (planning, the organisation of venues for meetings, the management of experts, logistic support to the working groups and to the dissemination effort). (2) three study groups: Legal Issues, Technology Options and Business Models (each group will meet 12 times over a period of one year). (3) Sector profiling

(gathering of intelligence on the European music industry). (4) Systematic dissemination of results via the consortium members, via the trade press, via participation in appropriate high profile events. (5) evaluation of the scope and impact of the action.

5. Projects In the Context of INFO 2000

Overview of INFO2000 programme activities with regard to **multimedia rights clearance systems** *"MMCRS"* - the *process whereby multimedia producers seek to obtain from rightholders the required permissions for reuse of text, sound, image, video, or other digital objects in a multimedia product or service*. INFO 2000 was a multi-annual (1995-1999) Community programme to stimulate the development of a European multimedia content industry and to encourage the use of multimedia content in the emerging information society, http://www.cordis.lu/econtent/mmrcs/home.html).

5.1 VERDI (Very Extensive Rights Data Information)

- http://www.cordis.lu/econtent/mmrcs/verdi.htm, www.verdi-project.com and www.verdi-system.com

- **Description:** networking of existing collectively managed multimedia rights clearance systems in six Member States; aimed to create a Europe-wide multimedia information and *licensing centre* offering fast and easy access to cross-sector, cross-cultural and linguistically diverse material. It provides a complete overall concept and platform for an integrated online licensing system.

- **Functioning:** flexible system built on the principle of voluntary participation. Each rightholder can choose whether to use the VERDI system as an information broker and grant licenses individually, or to fix the prices and conditions of each of his works and engage VERDI to distribute them on his behalf. Alternatively, rights owners can commission VERDI to act for them in negotiations with multimedia producers, using uniform tariffs and conditions established by the national collecting societies.

- **Results:** VERDI provides a complete overall concept and platform for an integrated online licensing system, capability to search for works in multiple partner databases and integration of content provider databases through XML (extendable mark up language) protocol.

5.2 INDECS (Interoperability of Data in E-Commerce Systems)

- http://www.cordis.lu/econtent/mmrcs/indecs.htm and www.indecs.org.

- **Description:** aims to create interoperability of digital content identification systems and rights metadata within multimedia e-commerce by establishing a comprehensive e-commerce and interoperable rights clearance system at cross-sector and European level.

- **Functioning:** *provides "rules"* which can automatically recognise different kinds of identifier and obtain further information about the objects which have been identified; *uses a model to identify and describe intellectual property items from data sources previously considered incompatible*; encompasses a *generic metadata analysis*, a metadata dictionary, principles for mappings to other

schemas and a 'Directory of Parties' Proposal. The *rules* identify and describe intellectual property items from different data sources and often mutually incompatible systems by 'mapping' them onto the model. The *dictionary* holds all of the information on INDECS metadata elements, (names, identification numbers, definitions, relationships and mappings to elements in other schemas). The first part focuses on commercial and descriptive terms, while the second part is concerned exclusively with legal terms. The *Directory of Parties* outline specification sets out the issues relating to the structure, function and operation of a commonly accessible Directory of Parties.

- **Results:** INDECS has already been applied successfully to major schemas, including for the *recording industry, the library and museum communities and the book industry*. In addition, the partners have established a non profit-making organisation called the INDECS framework, to build on the results of the programme.

5.3 EFRIS (Extended Frankfurt Rights Information)

- http://www.cordis.lu/econtent/mmrcs/efris.htm, www.book-fair.com

- **Description:** sector specific multimedia rights clearance systems for book publishing; was designed to extend the annual FBF (Frankfurt Book Fair) into an all-year round online version of its rights catalogue. The project has created a web-based interactive rights information system enabling participants to update their own rights information and to contact other rightholders directly.

- **Functioning:** The Frankfurt Virtual database is accessible via the FBF website. Using a powerful search engine, visitors can search the vast title and rights catalogue by subjects ranging from anthropology to young persons' books, key words, product type, title, author, language, exhibitor, country and types of rights.

- **Results:** The FBF data base today represents an all-year round online version of a Rights Catalogue and is being extensively used throughout the industry. The Frankfurt Rights Catalogue is a continuous operation allowing updates and new registration of titles, as well as promotion and marketing efforts throughout the year.

5.4 TV Files - IPR Rights for TV Programmes

- www.tvfiles.com and www.cordis.lu/econtent/mmrcs/tvfiles.htm

- **Description:** aims to raise the quality and diversity of European television programming and multimedia production by shortening substantially the research time needed to evaluate content, quality and ownership and giving rightholders, television producers and distributors access to hundreds of buyers; supplier of broadband Internet, digital video and satellite data-casting communications (developed in association with the European Broadcasting Union (EBU)); TV Files 'screenings on demand' service is designed to provide European tv programme buyers and multimedia producers with all the decision making data they need to evaluate international productions, including intellectual property rights (IPR) and programme information. 'Screenings on demand' is a combination

of information website, video-on-demand, and interactive television channel dedicated to TV programme buyers.

- **Functioning:** Based on IP (Internet Protocol) over DVB (digital video broadcasting), TV Files handles secure bursts of data, transmitted by satellite link, cable or digital terrestrial networks to PCs, decoders or other IP devices. In the 'screenings on demand' application, producers send their data and video to the TV Files service centre. Extracts of each programme are encoded at television quality (MPEG-2 at 3.5Mbit/sec) and at "video streaming" quality (Quicktime at 256Kbit/sec), for viewing respectively on TV Files decoders or directly on the website. An internet browser enables users of the system to search content in real time by category, territory and rights availability, and to request the download of video clips. The TV Files Video Centre collects the requests and transmits the video clips to the recipients, who can either view data during transmission or record it for later viewing. The material is 'watermarked' with the TV Files logo throughout. All satellite transmissions are encrypted for additional security.

- **Results:** TVF signed an agreement with Sun Microsystems to supply European content providers and internet service providers with distribution of video content on-line, thus exploiting the enormous potential offered by broadband connections; partnership agreement between TVF and the international satellite consortium (2000), with Eutelsat becoming a TV Files shareholder.

5.5 PRISAM (Producer Rights Information System for Audio-Visual and Multimedia)

- www.prisam.com and http://www.cordis.lu/econtent/mmrcs/prisam.htm

- **Description:** information system to speed and simplify negotiations between European producers and editors of multimedia products on the one hand and rightholders on the other. Plans are now in place to extend content to include works administered by companies in several other European countries. The one stop information shop is the brainchild of the four founding members of the European Federation of Joint Management Societies of Producers for Private Audio-visual Copying (EUROCOPYA). The project aims to procure and transmit information about copyright and neighbouring rights to audio-visual works.

- **Functioning:** The PRISAM web site contains around six thousand feature films (but content will grow). For various types of content *copyright is administered by the four participating organisations*. The site's home page is freely accessible for general information, but subsequent levels are password secured and available only to registered users, such as multimedia producers. A *search facility* allows users to identify titles according to a range of criteria, such as International Standard Audio-visual Number (ISAN), title, genre, producer/director, actor, composer. Having searched all the mirror databases, PRISAM displays relevant information for the best matches only.

- **Results:** plans to extend content of the PRISAM web site to include works administered by other EUROCOPYA companies in Spain, Sweden, Austria, Poland and beyond. The participants will also expand their IT resources to reflect the number of new members joining the project.

5.6 ORS (Open Rights System)

- www.cordis.lu/econtent/mmrcs/ors.htm and www.open-rights-system

- **Description:** ORS is an internet portal providing fast access to the many different companies holding information on rightholders, management modules and music-related rightholder organisations throughout Europe. The system is *designed to help users* to either obtain rights clearance or make swift contact with the relevant rightholder and *to reduce the time, inconvenience and expense associated with acquisition of copyright*, giving a strong competitive advantage to European multimedia producers and content developers. Its practical design allows rightholders to join ORS without the need to change their own database structure.

- **Functioning:** The ORS prototype software consists of three sections: (1) The web portal allows the user to identify rightholder organisations and to either obtain tariffs, negotiate rights clearance directly or make immediate contact with the relevant individual via phone, fax or email. (2) An interfaced standard database structure allows ORS to interact with the many different database structures of the rightholder organisations. (3) Management modules enable the user to make his searches according to a wide range of criteria, follow these through to contract stage and receive progress reports on outstanding requests for rights clearance.

- **Results:** SCPP's own database of a million CDs and 20,000 music videos has been on-line since December 1999, as part of the ORS project. The prototype now contains contact details for over ninety rightholder organisations; the project is set to continue, with the involvement of some new partners and with possible additional funding from the EC's new multi-annual programme, 'European Digital Content for the Global Networks'.

5.7 BONA FIDE (Broker Based Network Architecture for Fail-safe IPR Clearance of Digital Content)

- www.cordis.lu/econtent/mmrcs/bonafide.htm and http://bonafide.archetypon.gr

- **Description:** "broker architecture", developed to address major issues in *multimedia rights clearance*, such as the *availability of information about processes and procedures* for locating and clearing rights, the use of *model legal contracts* and the availability of advanced multimedia storage and delivery mechanisms; *designed to store and distribute multimedia content* in a secure environment on behalf of rightholders *and to allow usage to be monitored*. Producers and end users can search for, acquire and pay for suitable content; provides handling of multimedia content registration by rightholders, support of different licensing schemes and automatic distribution of licensed content to producers; used to enhance the distribution of web-based educational products and industrial training, and for the development of advanced systems for use by web portals. The database currently contains several thousand photographs, paintings and other images from the Giunti multimedia catalogue (museums of Florence), but the system is equally suited to the storage of audio files, moving images and texts such as chapters of technical books.

- **Functioning:** the "broker" consists of two sub-systems covering IPR and Storage and Delivery. The IPR Clearance Sub-system handles *licensing and monitoring of*

the system content, beginning with unique identification of each multimedia object, using the International DOI Foundation's (IDF) Digital Object Identifier scheme. Each time an object is requested, the broker system informs the consumer of options allowable for acquiring it within the available licensing schemes of the rightholder. Following each successful transaction, information about the scheme selected by the end user is passed back to the rights owner; a monitoring service detects whether multimedia content has undergone the BONA FIDE watermarking procedure or whether it is being used illegally. The system also includes mechanisms for electronic payment. In addition, related services providing for the digital storage of data and their respective metadata information, delivery of content according to contract, secured preview and advanced retrieval services, both interactive and subscription based and enhanced indexing and searching capabilities to the benefit of users.

- **Results:** The project has been presented to a wide range of audiences and has received publicity in Italian weekly newspapers; plans to incorporate the technology into the distribution of some other products, such as web-based education and electronic magazines.

5.8 COMPAS (Copyright Management and Multimedia Rights Clearance Best Practices for Educational Multimedia)

- www.odl.net/compas and www.cordis.lu/econtent/mmrcs/compas.htm

- **Description:** COMPAS is a multi-lingual web-based information service for multimedia service companies, production agencies, training organisations, publishers and rightholders. It is designed to handle copyright issues encountered by practitioners **in publicly funded educational and training multimedia**, rather than from the viewpoint of lawyers or rights owners. It facilitates the development of common approaches to copyright problems related to the management and exchange of educational and training multimedia products, which are financed by public or joint public-private funding. The resource is helping public institutions, scientific organisations and production companies and has attracted considerable praise from the UK's Learning and Skills Development Agency.

- **Functioning:** The core of COMPAS is a web site, divided into public and private areas. While the *public area offers details of the project*, as well as relevant events, news and useful contacts, the most valuable information is available via a password-protected *'private' area*. This *contains a database of questions and answers designed to resolve the most frequently encountered problems in rights clearance*. The content is classified in several ways, with menus related to type of media, country of origin of assets and categories of intended use. Visitors can search by categories or by words in the text, using the tick box menus, which are available in English, Italian and German.

- **Results:** COMPAS has introduced an integrated environment on the web, capable of supplying institutions, producers and distributors with advice on procedures and operations which can be applied to copyright problem-solving.

5.9 *b*© - Before Copyright

- www.cordis.lu/econtent/mmrcs/bc.htm and www.bcrights.net

- **Description:** *b©* is a networked agency dedicated to multimedia content development for European co-productions. A complete, reliable one-stop shop for all types of rights transactions, it provides a secure environment for the development of titles in the audio-visual and electronic publishing industries. *b©* provides a trusted environment for collaboration and rights trading, allowing different individuals to work together to develop multimedia content flexibly and cost effectively, while protecting each intellectual contribution. European organisations ranging from film companies and sound studios to video producers and electronic publishers are now using the *b©* technology.

- **Functioning:** The *b©* technology is based on original software, known as *the Notary System*, combined with a set of exclusive tools for multimedia content development. These comprise ethical-legal, collaborative, editorial and transactional models and procedures. Titles are developed on a series of levels, using networked agency on-line services. For example, *editorial advice* can be provided at the 'embryo' stage to give shape and structure to a project, allowing it to be put forward for co-production. At the next level, the *work is taken from structured to 'potentially partnered' project*, using services such as brainstorming, marketing consultancy, script analysis and legal advice and so on to the next level and towards production. An *'electronic signature'*, firmly restricted to recognised parties, *allows access to the site*. Producers, screenwriters, editors and other participants, such as marketing, financial or technical consultants may enter the platform as project collaborators. Participants browse a list of projects in which they are currently involved, access the project development environment and check current provisions of contracts.

- **Results:** Thirty partners, ranging from film companies and sound studios to video producers and electronic publishers are now using the system to create content. The interest raised by the system currently involves producers from the five largest European countries. More than fifty producers and some hundreds of projects are expected to be serviced by the system before the end of 2001. The system's content is now being expanded to encompass further creative talent, as well as producers and publishers, editors, legal consultants, distributors and broadcasters, rights agencies, collective rights organisations and financial institutions. The project's participants also plan to license the product to other sectors, such as advertising, fashion and software.

6. Other Projects

Up to now, there is no project dealing with “digital rights” launched within the **eContent** programme. But there will be projects launched by October 2001 under the Action Line 3 “Increasing dynamism of the digital content market”. The eContent programme is aimed at supporting the production, dissemination and use of European digital content and to promote linguistic diversity on the global networks and was adopted by the Council on the 22 December 2000 for a period covering the years 2001 to 2005.

There also is a new support measure selected by D2 under Call 6, the so-called **« Interparty » project**. Also EBLIDA, a grouping of national library associations has been active in connection with the copyright directive and have lots of information and contacts of their own (See: www.eblida.org)