New **Ar**chitectural Concept to remotely Build, **De**ploy and **Co**ntrol Complex Multi**media** Contents over the Internet

Type of funding scheme		Small or medium scale focused research project (STREP)	
Work programme topic addressed		Objective ICT-2009.1.5: Networked Media and 3D Internet	
List of participants			
1	Emotique	EMO	Spain
2	Fraunhofer IDMT	FHF	Germany
3	Lancaster University	LAN	United Kingdom
4	Universitat Ramón Llull Fundació Privada	URL	Spain
5	C3	C3	Hungary
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PART B - Table of Contents

Proposal Abstract:

ArcDecoMedia proposes the definition, design, development and demonstration of **a new Architectural Concept** that will allow **multimedia creators**, **producers** and **exhibitors** to **remotely build, deliver and control** complex professional multimedia systems in an **intuitive manner**, incorporating also more **adaptive**, **participative and communicative forms of content**.

ArcDecoMedia provides the right answer to a number of S&T challenges:

- Finding the best **strategies for Multimedia Content Deployment in Complex Multimedia Systems Control**, guaranteeing security and IPR of creators.

- Finding the best **strategies for the Control of Complex Multimedia Systems,** including the best remote **Communication & Synchronization strategies** that will support the Multimedia systems of the future.

- Exploring **the adaptability of delivered multimedia content** to a wide range of user contexts (e.g. different types of devices - from complex digital signage installations, to PCs and mobile devices - and display conditions – daylight, night, outdoors, indoors, etc -) .

- Understanding the **needs and limits of User Interfaces in future multimedia**, exploring the relationship between users and multimedia systems in highly reactive and interactive context aware systems.

As a result, **ArcDecoMedia** will develop a new **scalable** architecture that enables to make multimedia content and knowledge accessible, interactive and usable over time by humans and other physical devices (e.g. multimedia sensors, mobile devices, etc) and machines alike. **ArcDecoMedia** will demonstrate, test and validate the solution in two different environments one related to Art Performances and the other one to Commercial activities.

B.1 Scientific and/or technical quality relevant to the topics addressed by the call.

B.1.1 Concept & Objectives of the ArcDecoMedia Environment

B.1.1.1 The ArcDecoMedia Concept

The **ArcDecoMedia** project proposes the creation of a new architecturing concept that will give solution to the new challenges the multimedia products of the future will have to overcome. These challenges are, mainly, availability of growing multimedia contents **anytime**, **anywhere** and **anyhow** (i.e highly customized) in a **secure** way and by means of a **low-cost** technology.

Multimedia Technologies and content are increasingly present into all commercial sectors that are closely related to citizens. All the companies and institutions with direct relations to citizens ranging from **finance** to **fashion** and from **museums** to **insurance** are continuously exploring new ways to make information available to the user in a more attractive and interactive manner (e.g by providing new types of contents and by allowing the user to update information in real-time). Most innovative organisations are introducing mechanisms to obtain knowledge about potential customers (e.g. by introducing new interactive experiences related to new emerging personal technologies, such as PDAs, cell phones, iPhone, etc) with a view to better adapt their products/services to individual requirements and wishes.

Multimedia systems are the response to these market needs, whereas nowadays there's not any multimedia system that gives a conceptual solution to all the demands from the market, specially for remotely deploying and controlling multimedia content in a cheap and secure way. One example of nowadays solutions are the **set top boxes (STBs)** used in digital broadcasting which are **expensive** and not escalable. Despite **IPTV** applications are a better solution they are deployed over **private, dedicated networks** to assure quality of service, but volume of traffic is restricted and required infrastructure is still very expensive.

The objective of the **ArcDecoMedia** project is, not only supplying a new technical solution to the sector, but going a step beyond the market needs and propose the **multimedia concepts and solutions of the future** where the most important aspect is the users' experience. To build up this concept is necessary to define multimedia systems that enable:

- **remote deployment** of big volumes of multimedia content.
- **remote control** of complex (interactive, multi-display, adaptable) installations.
- **secure transactions** that assure integrity if the creations.
- **secure transactions** that ensure creators' intellectual property rights.

The future of the multimedia investigation have to go through new paradigms of community collaboration (e.g. YouTube, Linux Community, Apache project, etc) and new ways of integration and reinterpretation of the multimedia technologies. Specialization must be abandoned in benefit of a more **horizontal** and **multi-disciplinar research** where industry, creators of diverse disciplines and research community join their efforts to obtain better results. For example, Vision

Systems that are commonly used for security installations will be adapted to new forms of interaction; the technologies used for video games (non-linear participative information) will be adopted by other sectors than gaming (e.g. political campaigns in Second Life, use of Wii-mote technology for robot control, etc).

In this sense, the **ArcDecoMedia consortium** will define a new architectural approach, as well as a set of tools to be integrated in a common environment, that will let all the actors in the creation, deployment and exploitation of a complex multimedia systems to build and exploit multimedia contents worldwide. The architecture must provide the following services:

1. **Secure distribution of contents over the Internet to distributed multimedia systems:** the architecture will allow creating, configuring and deploying sets of installations over the internet. It will enable the configuration of different topologies of multimedia systems that may be world-wide distributed and configure and deploy them, identifying the source of the content, how, when and where to be deployed. One possible real life example could be connecting all the elements of a set of museum video-art installations worldwide - DBMSs, Server Systems, Display Systems, etc - indicating by means of which technology it will be securely deployed –P2P, VPN, etc-, which video-art piece must be reproduced in which museum and in which specific installation.

2. **Secure control of installations and contents over the Internet** the architecture will enable the control of world-wide distributed multimedia systems, handling synchronous (hardware diagnosis, status of previously programmed reproductions, status of processes, etc) and asynchronous full-duplex communications (especial events, such as response from interaction with people watching the installation) with the system.

3. **Easy self-adaptation** to increasing volumes of data (since multimedia content is more complex day by day). In order words the architecture provided must be **scalable**.

4. **Provide mechanisms to transform multimedia systems (including its content) into context aware systems:** the architecture should allow creating reactive multimedia systems from several points of view:

    a. From the **creators'** point of view, the content should be able to adapt to several environmental conditions (e.g. light intensity and ambience noise) when deployed in order to guarantee the content is reproduced as desired.

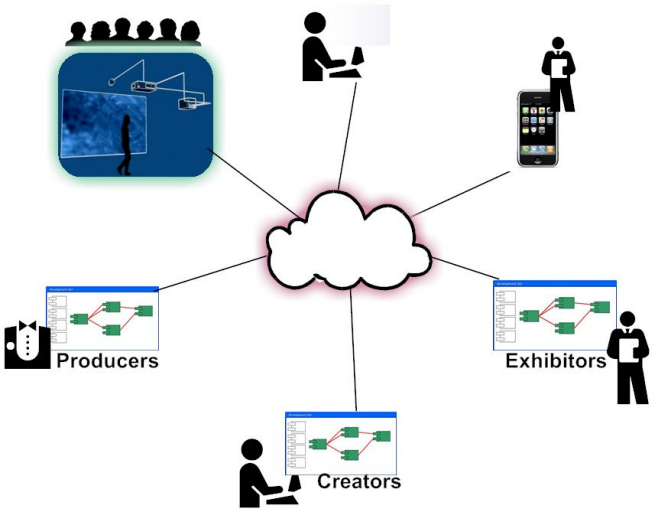
    b. From the **producers**' and **managers'** point of view, the system should provide different security mechanisms depending on the type of installation the creation is deployed.

5. **Collaborative network for the interchange of content**s. Growth of multimedia systems, as presented in the proposal, will stimulate new types of interdisciplinary collaboration creating the necessity to share contents (programming, design material, audio/video materials, etc) for a variety of users and situations.

As a conclusion, the ArcDecoMedia Architecture will be a Software Solution for the commercial and R&D community that:

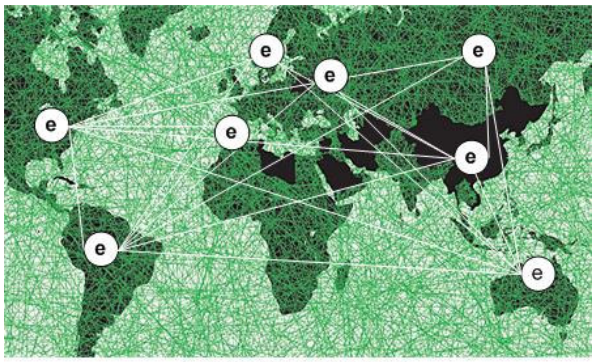
- Will enable the creation of multimedia distributed systems
- Will enable to obtain and analyse information from the environment, users and systems.
- Will make the R&D activities cost-effective and sustainable in creative terms, even for SMEs, enabling its fast and affordable materialisation in commercial products.

What characteristics should have an architecture of this type to become the solution the sector requires?



1. The Architecture proposed in the ArcDecoMedia project will be based on an **open, modular paradigm** that will allow the multimedia creators, producers and exhibitors to easily deploy multimedia contents into the most complex technologies. Content will be deployed intelligently, self-configuring the target installation where the content will be displayed/reproduced. Some of the variables the system will need to be aware of are light intensity, ambience noise, number of people visiting the installation, etc. (**context aware**). In order to facilitate the **design of the distributed system topology** to non-technical staff, the architecture will provide a visual programming pattern to the users of the ArcDecoMedia solution where the user will also be able to configure the behaviour of the installation.

2. The Architecture proposed in the ArcDecoMedia project will also allow **control of multimedia distributed systems.** The power of multimedia systems relies, both on the update of contents in real-time (transmission of information to the receptor immediately) since the market requires constant update of contents, and on the possibility of interaction in its wider conception: systems can be controlled locally or remotely from any site in the world.

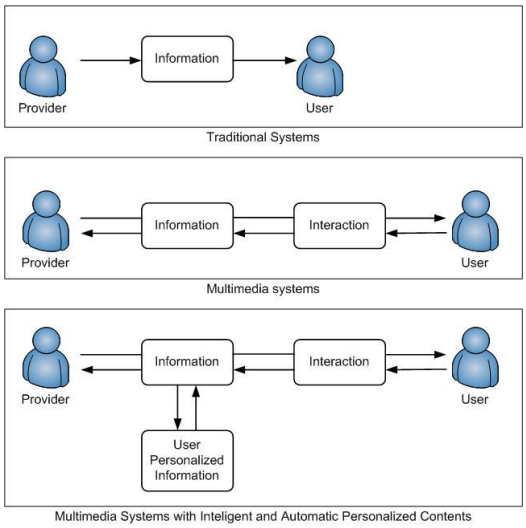


Internet Connection Map

In this aspect there're two key issues for the multi-media systems:

i. **Inter-communication of systems:** nowadays an isolated device has no sense (e.g. a mobile device nowadays interacts with other mobile devices or other systems, but also could behave as a remote control or allow changing video contents in a museum). Value of multimedia products will not be based on their features but on the relationship of the technologies in the environment.

ii. **Creation, Deployment and Centralized Control of Distributed Systems**: another key issue is the creation, deployment and start-up of such systems. There're still no affordable solutions (e.g. IPTV through VPN, STBs, adapted iDTV solutions) for handling the complexity these type of new multimedia solutions enclose: linking, testing, controlling and updating.



3. The Architecture proposed in the ArcDecoMedia project will make context awareness possible from different angles. Therefore the solution will allow searching for information and distributing it to specific targets with determined characteristics, more than being broadcasted. The platform will allow retrieving information based on the characteristics of the receptor and create customized contents. This drawing represents the evolution of multimedia systems from simplex communication of unique messages to full duplex communication with customized messages (from one-to-one to many-to-many).

Which are the types of creations that will be able to be created by means of an architecture like this?

Let's think about a couple of scenarios that might occur in a near future and how ArcDecoMedia Environment could provide the solution:

Scenario 1:

A pedestrian goes shopping and stops before her/his favourite fashion shop. When she/he enters the influence radio of the shop the shop-window shows the articles that are potentially more suitable to her/his like (context awareness). *Even a mirror in the shop would show how the whole spring collection fits her/him, even before patronizing* (multimedia content deployment/distribution). *She/he could even customize the product and feedback the fashion designer with her/his opinions* (storage search and manipulation of information). *On the other side, the mirror will be able to show new products that are*

suitable to her/him. Even she/he could show the content of the mirror to her/his friends who could give their opinion (social networking). *Furthermore all this provision of content could be made from a single point to shops worldwide and installations could be controlled and monitored from this single point* (remote control of distributed multimedia systems).

Application of ArcDecoMedia in Scenario 1:

This scenario describes a complex interactive (shopper - shopwindow) and context aware system (system – user). In this scenario the ArcDecoMedia environment would provide developers of the graphic user interface with a framework to be integrated into, even providing repositories of contents in different formats in the GUI (contents = realistic graphical representation of suits). Furthermore the ArcDecoMedia would also allow the integration of all the technologies present in the system: artificial vision systems, ambient intelligence software for detecting customer profiles, audio and video replay systems, content broadcasting, content storage and search, etc. Even it'd enable the design of a network of systems which control would be centralized.

Scenario 2:

An important network of museums (Guggenheim) owns a huge repository of multimedia content from video-art installations. With the occasion of a specific event or celebration, a single content or a combination of contents may be broadcasted to all the museums so they can reproduce it in the required environmental conditions. This content or contents can be reproduced at the same time or even customised to their specific requirements regarding what, how and when is reproduced at each single museum. Furthermore, the video-artist may combine his/her contents and easily deploy new experimental creations in a number of museums at the same time.

Application of ArcDecoMedia in Scenario 2:

This scenario describes a complex distributed multimedia system. In this scenario the ArcDecoMedia environment would be used to create the topology of the network. The contents would be available for example to creators and exhibitors, each of them with their own security profiles. In this way creators could search, modify and combine contents (with the intelligent search and editing options) and exhibitors deploy them world-wide.

B.1.1.2 Motivation for the ArcDecoMedia Environment

All the ArcDecoMedia industrial partners are involved in the creation of art performances with a strong technological component and also in the development of complex audiovisual interactive systems with other purposes, mainly advertising. All of them think that the key factor for competitiveness in this sector is Software and "Domestic" technologies (PCs, portable computers, PDAs, low-cost cameras, etc) more than the complex hardware systems existing nowadays for this type of installations. This strategy will allow end-users of the ArcDecoMedia solution to provide their customers (commercial brands in advertising events, museums, TV channels, Information Points, etc) with complex interactive systems that integrate cutting-edge technologies (such as mobile technology: cells and PDAs, Wii-mote technology, interactions with security cameras,

sensor systems, interactive illumination systems, etc) which are day by day more commonly requested. These new requests have arisen the necessity to create a way to integrate the most up-to-date technological advances (i.e. 3D and 2D real time render systems, video games engines, new devices, etc) in an easy and understandable way, but assuring the creation of high quality, robust and secure products for the audiovisual industry.

Nowadays there're a lot of tools that allow the development of certain aspects of a complex audiovisual interactive system, but they do not provide an overall solution to the problem. This fact provokes a growing complexity in this kind of systems, making them difficult to design, install, verify and control. Even, most of the existing solutions are hardware based, which are expensive, difficult to automate and update, require experienced technical staff and are difficult to transport.

In conclusion, lack of wide spectrum technological solutions that would give response to the availability and customization of contents and multimedia systems has led the ArcDecoMedia consortium to propose the present project.

B.1.1.3 S&T Objectives

The main objective of the project is the creation of a **scalable**, **secure** and **low-cost** Architecture to allow provisioning of context aware multimedia content over the Internet. Furthermore the Architecture would enable the remote control of the Complex Multimedia Systems where the contents would be hosted.

Apart from the general objective, the proposal encloses various scientific and technological challenges:

O1. Finding the best strategies for **Multimedia Systems Communication & Synchronization** through the Internet that will support the Multimedia systems of the future.

O2. Finding the best strategies for **Multimedia Content Distribution and Control** over the Internet allowing creators to share and combine materials and technologies, guaranteeing integrity of the creations and intellectual property rights of the creators.

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O3. Finding the best strategies for **Multimedia Content and Technology to self adapt** to context requirements without the direct intervention of technical staff.

O4. Building up a **collaborative network for the interchange, deployment and control of content**s, where new types of interdisciplinary collaboration would raise from the necessity of contents sharing (programming, design material, audio/video materials, etc) for a variety of users and situations, guaranteeing fidelity and integrity of the materials, as well as secure transactions and intellectual property rights of the creators.

O5. To **validate the architecture** it will be demonstrated in different pilot applications: the Audiovisual Industry (contents and services), Academia/Research, Arts & New Technologies.

O6. To identify the multimedia paradigms of the future.

The objectives presented in the proposal perfectly fit the objectives targeted by the work programme as stated in ***Objective 1.5 Networked media and 3D Internet***, specifically in target ***a) Content aware networks and network aware applications***, since the program is encouraging researchers to prepare projects that propose *"Architectures and technologies for converged and scalable networking and delivery of multimedia content and services dynamically optimised with policies taking into account the content and adaptation needs, the user contexts, requirements and social relational network for a variety of contents, services that may include home management, applications, locations and mobility scenarios. They enable multiple user roles as content producer, user or manager"*, which are the main research challenges ArcDecoMedia proposes***: Scalable, Adaptable, Secure Architecture enabling context-aware deployment and control of Multimedia Contents***.

B.1.2 Progress beyond the state-of-the-art

Please see bibliographical references of this section in B6.2

Traditional broadcasting such as **DVB-T** and **DVB-S** are usually integrated into set top boxes (STBs) or **Integrated Digital Television sets (iDTV)** and provide viewers with a set of channels that is non-interactive. More recently **hybrid STBs** have become available which integrate both **traditional broadcasting** and **Internet Connectivity**. The Internet connectivity typically provides video on demand and interactivity to augment the traditional linear broadcasting model. The success of this model is resulting in the production of **IPTV** only STBs.

In order to achieve success of IPTV systems, typically they're deployed over private, dedicated networks to ensure sufficient QoS and performance. This has two disadvantages, the first being that the scope of content which runs on the system is limited to only that which the IPTV operator provides. The second is the cost of providing this infrastructure is considerable.

In order to decrease the cost of providing such services and increase the range of content available, IPTV provides are turning to the open Internet to provide services, this allows content to be provided from anywhere. However not all services are available on the Internet (**multicast**) and certain communication methods are not scalable or cost effective (**unicast**). As a result of this research has recently been focused on **P2P distribution technologies**.

P2P provides a means by which multimedia content can be distributed without any significant infrastructure to a large number of internet clients. However P2P was never designed to send live multimedia data, it was designed to deliver data on a best-effort basis. As such considerable research (**EU FP7 P2P-Next**) has been looking into providing a framework that can deliver P2P multimedia. Apart form the content context awareness, for the development of the project proposed in ArcDecoMedia the main research technological break-troughs the consortium will need to overcome are:

- to identifiy the most appropriate **distribution technologies and network environments** for the purpose of the project that guarantee **security, privacy and intellectual property rights** of content creators;
- how the different multimedia elements and control devices will **communicate and synchronize among** each other and how to control them over the Internet;

B.1.2.1 A brief state-of-the-art on Distribution Technologies and Resources

One of the technologies most widely known for content distribution are ***CDNs (Content Delivery Network)***. A CDN is a distribution system on the Internet that accelerates the delivery of Web pages, audio, video and other Internet-based content to users around the world. The CDN replicates the content provider's files in servers, called ***"caching servers"*** or ***"edge servers"*** located in geographically dispersed datacenters. Most CDNs are ***third-party services***; however, large companies may develop their own "enterprise CDN" (eCDN) to support remote locations more effectively. When content is replicated throughout the world, it's delivered to users with greater speed and reliability. The CDN network routes the user's request for content to the appropriate caching server based on the user's location. CDNs are often connected to multiple ISP backbones and have peering relationships with others, providing high availability to users.

Amongst the various services a CDN may provide we can find ***Streaming and Downloading***. Video uses extensive network bandwidth, and many customers of a CDN use the service solely to stream video to Web users. A CDN may offer all popular streaming methods such as Flash, Windows Media, Silverlight and progressive download, the latter using the same HTTP protocol as Web pages. Large downloads such as gaming software are also candidates for CDNs. The CDN may pull the data from the customer's origin server, or the customer may upload the files to the CDN.

Hybrid CDN can also be found in Peer-to-Peer private held transmissions. This CDNs may support peer-to-peer processing but requiring client software to be installed in the user's computer or ***pre-installed in a set-top box***.

Akamai Technologies (http://www.akamai.com), is one of the first CDNs suppliers and can be considered the market leader. They deliver content for some of the largest content publishers in the world. As of 2008, Akamai, along with ***Limelight Networks (www.llnw.com)*** and ***CDNetworks (www.cdnetworks.com),*** had the lion's share of CDN revenues. Limelight keeps much of its customer traffic on its own international fiber network, and CDNetworks has extensive penetration in the Asian market.

Recently some companies, like *MetaAso* with their *Mermaid Technologies (http://mermaid.metaaso.com)* are also offering P2P services for content broadcasting: video, audio, videoconferencing or multisource. But this technology is still far from giving response to the type of products the multimedia sector requires.

B.1.2.2 A brief state-of-the-art on Media Distribution and Security

Within the context of ArcDecoMedia, there are some specific challenges concerning the distribution of content and security: authentication of users, usage of P2P for cost-effective content exchange while preventing the sharing of unauthorized content, basic content protection and content integrity & authentication.

As for the **authentication of users** within the network, i.e. the verification of a user's claimed identity this will be addressed by applying existing authentication standards and PKI tools.

Similarly, **content integrity and authentication** will be addressed with existing security standards, which will be adapted to the specific needs of ArcDecoMedia.

As for **P2P technologies** for efficient distribution, existing technologies such as JXTA or BitTorrent can be used. JXTA [3] seems to provide an especially good starting point providing a 3-layer architecture (kernel, services, application), XML-based communication protocols, and basic abstractions, such as peer groups, pipes, advertisements and a uniform programming platform for P2P applications. It provides well structured APIs and a clear separation of concerns in its architecture. However, the P2P technology used needs to be extended with mechanisms to **prevent sharing of unauthorized content**. For that purpose, an approach based on white list filtering will be applied and extended for the ArcDecoMedia scenario: A component for content registration will be used to "approve" content provided by users and issue licenses which are bound to the content. The distribution process will then be controlled based on those authenticable licenses, modifying the P2P architecture for that purpose.

Finally, **basic content protection** is relevant because it provides a way to control the access to content and provide a means for a fair compensation to authors. One possibility for that would be to use "classic" DRM approaches with rights enforcement, but this would require the integration of compliant DRM components into every application to be possibly used for production and playback, creating interoperability problems and limiting flexibility for the production process. Instead, a "lightweight" approach based on simple content encryption and secure key transmission using PKC will be applied. However, the sharing of encrypted content with P2P is currently limited in that common keys need to be used, which represents a security problem. For ArcDecoMedia, we will investigate how differently encrypted versions of the same content can be efficiently shared with the underlying P2P architecture/protocol.

B.1.2.3 A brief state-of-the-art on Multimedia Communication & Synchronization

The integration of time dependent media in applications requires the synchronization of media streams. The problem of synchronization arises if we consider multimedia data presented in distributed systems (machines), offices and countries with different local times.

As shown in the work by ***Lung-Hsiung Wang and Jan-Min Chen*** *in* the article "***Specification and Synthesis of a Multimedia Synchronizer"***, multimedia synchronization refers to a temporal, spatial, or logical relationship between objects, data entities, and media streams. However, from the viewpoint of realizing multimedia synchronization in terms of process communication and programming, multimedia synchronization implies a temporal relationship. Multimedia systems are characterized by computer-controlled generation, manipulation, storage, communication and presentation of independent media data. Synchronization among the various media data at the presentation level is a key need for a multimedia system.

There are some libraries that allow the implementation of a global system, like ***HCPN or Hypermedia Composition Petri Net***, which is a model that extends the formal specification of multimedia systems into the hypermedia framework. In fact we have already referenced it on the

previous passage. The main idea of this framework is to connect one piece of multimedia entity to another supporting spatial context and temporal coordination related to each hypermedia link, which is essential for a comprehensive hypermedia service.

The standard called ***Synchronized Multimedia (also known as SMIL)*** which enables authoring of interactive audiovisual presentations, integrates audio and video streaming with images, text or any other media type, working with an easy-to-learn HTML like-language and a simple text editor. This standard is part of the ***W3C (World Wide Web Consortium)*** and a detailed description can be found on its website.

Apart from classical software implementations, there are some hardware synchronizers, like the one presented in "***Automatic Hardware Synthesis of Multimedia Synchronizers from High-level Specifications"*** which defines a notation for the specification of multimedia presentations.

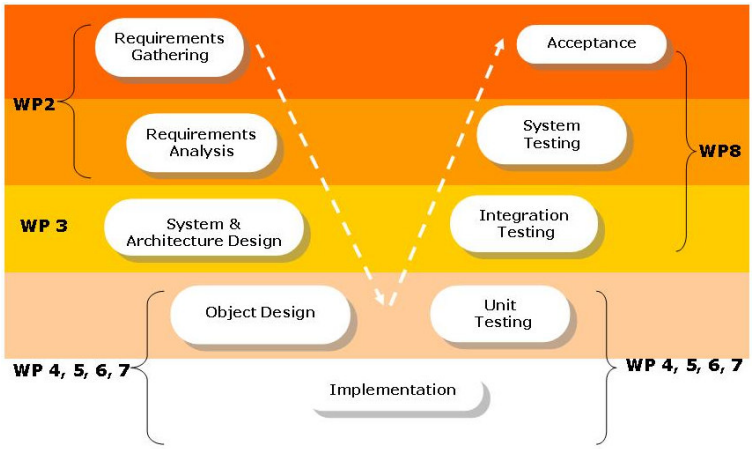
If we consider that this global system or environment can be ported to schools and universities we can think in an application or environment simulating a classroom. This application should include functions for synchronized viewing of multimedia content and sharing of multimedia objects. This is the idea of the work presented in the ***patent "Method and system for synchronizing and serving multimedia in a distributed network"***. This is a system and a methodology for embedding multimedia content in a distributed network, by using a synchronization server, a content server and some clients that receive the contents.

It comes clear that those packages should feature some characteristics like exception handling, fault detection, assessment in the case of damage and error recovery, while providing with a continued service ***(Exception Handling and Fault-tolerance in Multimedia Synchronization);*** Synchronization of media streams in distributed paradigms while applying time stamps ***(Synchronization model for multimedia communication and presentation in distributed systems)***; Voice management and its inclusion into a switching system within a packet network ***(Voice Synchronization in Packet Switching Networks)***; The reconstruction of packets even if suffering from uncontrollable delays ***(Techniques for Packet Voice Synchronisation)***; End-to-end transport protocols that compensate for the data skew arising when there's data loss ***(Delay Compensation Protocols for Synchronization of Multimedia Data Streams)***; Efficient synchronization algorithms for wireless and mobile multimedia platforms ***(An Efficient Synchronization Scheme of Multimedia Streams in Wireless and Mobile Systems)***; The definition of the involved metrics and rules desirable for distributed multimedia systems (***Synchronization Properties in Multimedia Systems)***; The implementation of real-time scheduling within the communications protocol ***(Multimedia Synchronization)***; and the guarantee that temporal ordering will be respected ***(A New Look At Multimedia Synchronization in Distributed Environments)***, among others.

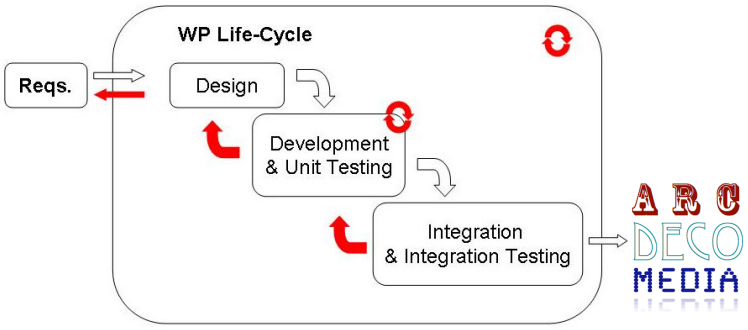
B.1.3 S&T methodology and associated work plan

B.1.3.1 Overall Strategy of the Work Plan

The work plan has been designed to eliminate, as much as possible, the critical paths in the project. *WP2 – Requirements Gathering and Analysis* and *WP3 – Architecture Design* are sequenced tasks that will feed *WP4, WP5, WP6 and WP7,* which are the work packages where the specific research and development activities will be performed and will run in parallel, thus avoiding bottlenecks when integrating the different modules into the Platform. Once the outcomes of these work packages are ready they will be integrated and demonstrated during the demonstration activities described in *WP8*.



As a whole, the project follows a traditional **V development life-cycle**, as presented in the drawing on the right. The development branch of the life-cycle (left branch) will be completed from *WP2* to *WP7*. The **verification & validation activities** (represented on the right branch of the life-cycle) will be performed in WP4 to WP8 in the following way: Together with the design and development of the different modules of the Platform, Unit Tests will be performed (considering Units as Modules). Integration, Systems Tests and Validation of the Platform (Acceptance) will be performed by means of the execution of the Demonstration Activities (*WP8*).



Despite the existence of a general life-cycle for the whole project, individual WPs 4, 5,6 and 7 will also have their own iterative life-cycle. The inputs of these WPs will be the collection of requirements and the architecture design, and the output of each of them will be integrated to build up the ArcDecoMedia Environment. Development and Unit Testing Phase will also be performed in an iterative manner. Both execution of Integration and Unit Testing may result in development, design and even requirements changes, which will be appropriately modified.

This strategy requires:

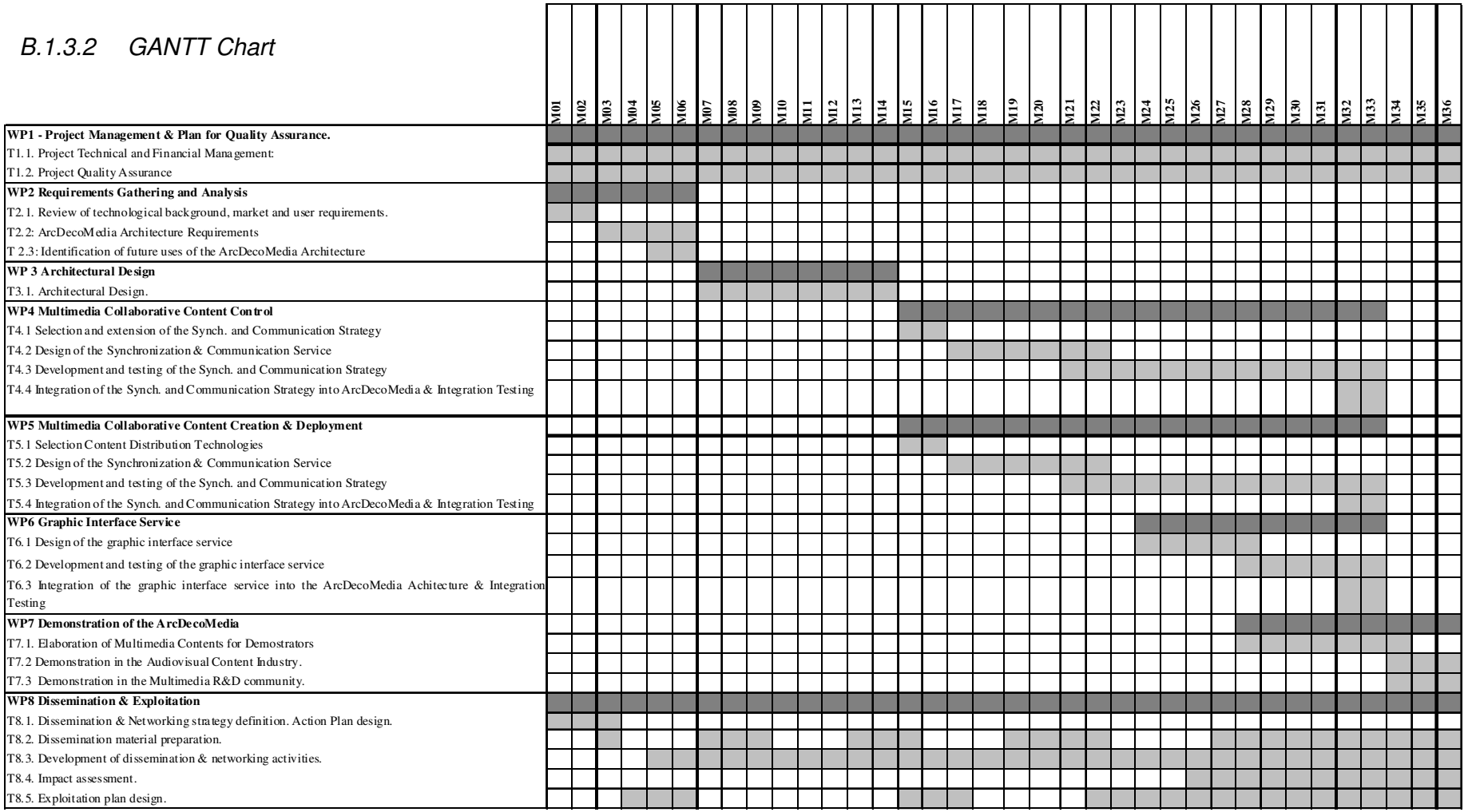
1. a **common workspace** for all the researchers in the project,

2. keeping a **sound control of versioning** for all the items produced during the project. During the first months of the project it will be chosen the best tool for keeping all these items under control that suits all the partners needs and environments (CVS, Subversion, CodeVille…). Despite deliverables will be provided in the required milestones, keeping control of the versions of the items will let the consortium provide the Commission with updated versions of those deliverables that are prone to change, such as:

    - requirements documents,
    - design documents,
    - source code,
    - tests,
    - graphical designs,
    - artistic productions, etc.

3. The introduction of **Bug Tracking tools** (BugZilla, JitterBug, RT…) will also be analysed to assure constant feedback among researchers.

B.1.3.2 GANTT Chart



B.1.3.3 Detailed Work Plan

The work proposed is formed by 8 work packages. *Management act*ivities (**WP1**), as well as *Dissemmination and Exploitation Activities* (**WP8**) will be performed along the duration of the project, which is 36 months.

After the activity oriented to gather information *requirements from State-of-the-Art, industry and end-users* (**WP2**), a first sketch of the *ArcDecoMedia Architecture* will be designed (**WP3**). This Architecture design will describe the technology chosen for the development of the Architectural concept, the services it will contain, how it will be configured, etc. Anyhow this activity will be fed-back by the 2 major research activities in the project, which are **WP4** and **WP5**.

It's important to highlight that the main research activities in ArcDecoMedia are identified in these work packages and that will be performed in parallel. The main activities are:

- identifying the best strategies to keep distributed multimedia systems synchronized and communicated, in order to guarantee proper control of the multimedia installations (which will happen in **WP4**) and

- identifying the best strategies to deploy content over these distributed multimedia systems in a secure way, guaranteeing intellectual property rights of the creators (which will happen in **WP5**).

Both WP4 and WP5 have a similar distribution of tasks:

- first **identification** of technological strategies,
- then **design of the services** to be integrated in the architecture,
- afterwards **development and unit** testing
- and finally **integration in ArcDecoMedia** and **Integration Testing**

Please notice that there's not a specific WP for Integration, instead a **Continuous Integration** approach is followed and each development WP has its own Integration Phase at the end.

Despite **WP6** is a shorter activity it's also very relevant since the consortium thinks it's very important to provide end-users with a *friendly, self-adaptable and scalable graphic interface* to design the installations and their behaviour.

Finally, **WP7** describes the *demonstration activities* that will be performed in order to validate the results of the project.

Partners that are WP leaders are written in bold letters in each WP.

Work package number	WP1	**Start date / starting event:**		M1		
Work package title	Project Management & Plan for Quality Assurance.					
Activity type	Management Activities					
Participant number	**1**	2	3	4	5	6
Participant short name	**EMO**	FhD	LAN	URL	C3	MED
P-m per participant	**9**	1	1	1	1	1

Objectives

The objective of this horizontal workpackage is to provide all necessary means and allocate resources to adequately plan and co-ordinate the whole project providing lean coordination of all related activities and tasks and identify possible sources of deviation and if necessary design corrective actions.

Description of work

Project management function will be responsible for the management of all financial aspects, including European contribution and auditing and also will monitor and assure the timely and quality project reporting to the European Commission. For this to be achieved, a specific quality assurance plan will be designed and managed.

The consortium will follow a flexible management strategy, to contribute to effective decision-making procedures, optimum internal communication, as well as appropriate administrative, financial, and technical control of the project. Work within each package will be the responsibility of the work-package leader with active contribution from the project manager and all the partners participating. The workpackage leader is responsible for planning the work, monitoring the timely and satisfactory execution of the work and for assuring compliance with the consortium quality plan. Deliverables will be subject to a formal peer review before delivery.

T 1.1. Project Technical and Financial Management.
This task covers activities related to the overall organization, planning and control of the project. It addresses liaison with the Commission, ensures timely delivery of deliverables and financial reports as well as any other contractually relevant document and includes contractually obligatory activities, namely:

- the overall legal, contractual, ethical, financial and administrative management;
- coordination of knowledge management and other innovation-related activities;
- overseeing the promotion of gender equality in the project;
- overseeing science and society issues related to the research activities conducted within the project.

Success criteria to measure this task will be assessed against the acceptance of the quality plan by the consortium within 7 months from the beginning of the project, the timely submission of project deliverables and the positive feedback from the periodic and annual review reports.

EMOTIQUE will perform the financial and administrative management and will also be responsible to manage the official project meetings and reviews to be agreed with the EC and supported by the WorkPackage leaders, as well as co-ordinate all management reporting to the EC.

The financial management and coordination will include: appropriate distribution of funding received according to the contract, preparation and co-ordination of cost statements and audits, whereby all partners will manage their own financial affairs w.r.t. the project. The scientific and technical co-ordinator will also be responsible for the technical co-ordination of the management & technical tasks of the project in assistance to the Steering Committee and General Assembly.

Task 1.2.: Project Quality Assurance
This task will deal with setting out the quality practices for the project, and with providing assurance that the quality requirements are planned appropriately. The main scope of the Quality Plan is to correlate the actions analysed in the relevant sections with the ISO 9001 standard. A set of users for the Quality Plan will be defined, each of them having different responsibilities, in a way that, from an early project stage, the collaborative actions undertaken by all the involved partners can provide assurance of meeting specific requirements and achieving the desirable results for the successive project completion. Detailing all tasks, defining all documentation and establishing the information flow and communication between the partners for smooth running of the project will be also EMOTIQUE task.

Deliverables

D1.1.1 to D1.1.4 Six Monthly Progress reports. Month 6, 12, 18, 24, 36
D1.1.5 to D1.1.6 Yearly Management Reports. Month 12, 24, 36
D1.1.7 Final Report. Month 36
D1.2.1 Project Quality Plan. Month 3
D1.2.2- D1.2.4 Financial reports And Audits. Month 12, 24, 36

Work package number	WP2		**Start date / starting event:**			M1
Work package title	Requirements Gathering and Analysis					
Activity type	Research & Technical Development					
Participant number	**1**	2	3	4	5	6
Participant short name	**EMO**	FhD	LAN	URL	C3	MED
P-m per participant	**11,5**	2	2	2,5	3	2,5

Objectives:

- To review the current SoA and technology background and define the basic architecture requirements.
- To feed the basic set of requirements with business requirements.
- To define a generic model that describes the rules governing the ArcDecoMedia architecture based on the requirements analysis in order to identify future uses of it in other industrial sectors.

Description of work

In this WP, it will be analysed the current existing practices, software tools and hardware equipment in the distribution and control of audiovisual and interactive contents and installations. The objective of this deep analysis of **the state of the art of the existing technologies** in the sector is *identifying a* ***basic set of requirements*** *of the ArcDecoMedia architecture,* clearly identifying the improvements, optimisations and new features with respect to the existing technologies.

Furthermore ***requirements of end-users***, who are limited by the current technology, will also be identified in order to give response to real market challenges. Novel methods on how the proposed authoring platform can be seamlessly integrated in the audiovisual sector and even other industrial sectors will be identified, reviewed, and evaluated.

Requirements Gathering and Analysis will be performed partially following the **Volere®** methodology (since this methodology is extremely complex and complete , a subset of the categories found in this methodology will be used).

Requirements will be **categorised** (functional-nonfunctional; usability-liability-security-maintainability-…). Each requirement will be **univokely identified** so researchers will be able to **trace** a requiremet from its early phase of definition to implementation and validation in the prototype. In this way the SQA will be able to measure the degree of fulfilment in the implementation and functioning of the expected requirements.

It will also be studied the possibility to use a Wiki or a specific software application **on the cloud** to let the consortium gather, manage and analyse the collection of requirements remotely all together.

Task 2.1: Review of technological background, market and user requirements.
The main areas that need to be reviewed are:

- New trends for collaborative interchange of interdisciplinary contents: programming, design, video/audio production, tagging, etc.
- Multimedia Distribution Technologies: hardware, software and network architectures, guaranteeing Security and Intellectual Property Rights of creators.
- Multimedia Synchronization and Communication of Distributed Multimedia Systems.
- Most common business practices will also be identified and their shortcomings will be analysed.

Task 2.2: ArcDecoMedia Architecture Requirements
The collection of requirements of the ArcDecoMedia architecture will:

- Identify improved functional (deployment choices, control options, display of events, etc) and non-functional (availability, liability, usability, security, etc) features from existing technologies.
- Identify new functional (deployment choices, control options, display of events, etc) and non-functional (availability, liability, usability, security, etc) features.
- From the previous task the main features to be improved from existing solutions Communication and Synchronization, together with the business practices the set of requirements for the ArcDecoMedia Environment will be identified.

Task 2.3: Identification of future uses of the ArcDecoMedia Architecture
ArcDecoMedia Architecture aims at becoming a standard for the multimedia industry, defining a generic model that describes the rules governing the sector's processes. Based on these collection of requirements the consortium will identify future uses of the architecture in other industrial sectors.

Deliverables:

D2.1 Existing Practices and State-of-art. Month 3.
D2.2 ArcDecoMedia Requirements. Month 6.
D2.3, D2.4 Future uses of the ArcDecoMedia architecture. Month 6.

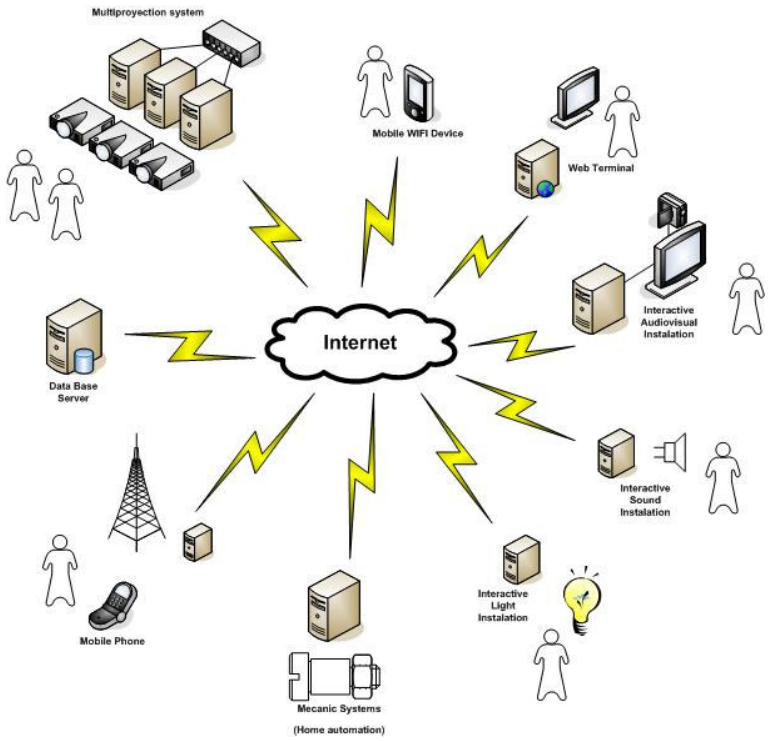
Work package number	WP3		**Start date / starting event:**			M7
Work package title	Architectural Design					
Activity type	Research & Technical Development					
Participant number	1	2	**3**	4	5	6
Participant short name	EMO	FhD	**LAN**	URL	C3	MED
P-m per participant	1	8	**8**	1	3	1

Objectives

To identify a common technical framework for the different services of the architecture.

Description of Work

In the present WP it will be proposed a general architectural design required for the design, deployment and control of complex distributed system as the ones that will be built-up by means of the ArcDecoMedia architecture. Herewith it'll be defined the architectural paradigm to follow (e.g. *Service Oriented Architecture*), the different software components and services that will compose the architecture, their externally visible properties and the relationships between them, but also the required hardware and design structures that support them and the appropriate programming tools and libraries to be used during the development of the architecture.



T3.1: Architectural Design.

Elaboration of the Architectural Design Document that encloses the basic main ideas for the creation of ArcDecoMedia at a functional, structural and physical level. In this design the best approach for the Content Distribution will be selected and improved: **P2P, Unicast, Multicast or Hybrid.**

This document shall:

- justify and develop the **architectural paradigm** that fits the best for the requirements of the environment:
  - N-Tier architecture,
  - Distributed Objects Architecture,
  - Loose or Tight Coupling – Service-Oriented architecture.

- Identify the best available technology, model and framework for the development of the architecture, like:
  - Java, BPEL, C++ or PHP programming languages
  - Containers such as Spring Framework or EJB

- identify the different functional or logical views of the platform after analysing the collection of requirements, including **content distribution strategy**.

- identify the **structure** required to implement the chosen paradigm and manage a scalable architecture.

- identify the **physical requirements**:
  - installable software components,
  - database management systems integration,
  - hardware infrastructure,
  - software libraries, development toolkits and operative systems

Deliverables:

D3.1: Architectural Design. Month 14

Work package number	WP4		**Start date / starting event:**			M15
Work package title	Multimedia Collaborative Content Control in Distributed Systems					
Activity type	Research & Technical Development					
Participant number	1	2	**3**	4	5	6
Participant short name	EMO	FhD	**LAN**	URL	C3	MED
P-m per participant	8	4	**18**	7	8	7

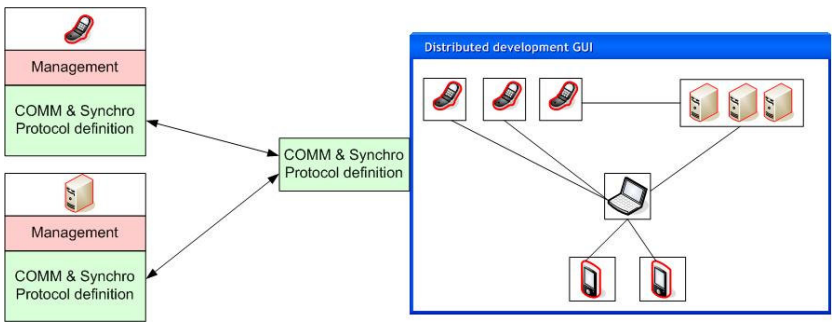
Objectives

- **Identifying the most suitable paradigm for Multimedia Coordination across devices in the ArcDecoMedia environment, including User Registration.**
- **Designing, developing and testing a platform for Multimedia Coordination, Communication and Interaction to be integrated into the ArcDecoMedia architecture.**

Description of work

Selection of the **core technologies** for supporting **presentation and interaction with multimedia performances** across the **heterogeneous devices** supported by the ArcDecoMedia Environment (responding to the requirements identified in WP2). These solutions will target the **transmission and orchestrated presentation of continuous data** (video and audio streams) and **discrete data** (control information, text, single images, etc) across **presentation devices and end-systems** (public displays, mobile devices), and support **communication of sensed and user-driven interaction events**.

Synchronization at the presentation level of the media elements (objects, data entities and media streams) in its different phases (generation, manipulation, storage, communication and presentation) is a **key issue** for the resulting quality of the overall multimedia experience. Maintaining a high **aesthetic quality** when it's a distributed multimedia system is a **challenging problem**, because information and media objects are stored as **separate sources** and **unexpected communication delays and failures between components** in wide area networks and mobile environments are unpredictable. Graceful degradation is desirable to mask and adapt to transient failures both in presentation terms and in supporting local and wide area distributed interactions.



Task 4.1 Selection and extension of the Synchronization and Communication Strategy
Evaluate strategies for orchestrating ArcDecoMedia performances (e.g. exploring techniques from multimedia synchronisation, such as Global Timer, Reference Points, Event Based Synchronization, and performance orchestration). We will also study the necessity of combining and extending these techniques to meet the requirements of the project.

Task 4.2 Design of the Synchronization & Communication Service
The environment will allow **creation of different topologies** for a distributed ArcDecoMedia application. The environment will allow the creator to draw the topology and choose the best way to communicate and synchronize the connected entities. Therefore the following elements will be designed in this task:

- A Graphic Control Service that complies with the graphical conventions established during the Content Creation Service design.
- A Repository of implemented Protocols (legacy or novel) that may be used.
- A Management Service that interfaces graphical and protocols service.
- A User Registration Service. In order to support authentication of rights information and metadata, and to control access of users to content and metadata within the P2P system, and control access to IP entities, users need to be both registered and certified. Based on the relevant usage scenarios, a service containing all the components for user registration and certification will be designed and developed. It'll be made by using an appropriate PKI, providing a User Registration component.

T4.3 Development and testing of the Synchronization and Communication Strategy
Development and unit testing of the issues designed in the previous task.

T4.4 Integration of the Synchronization and Communication Strategy into ArcDecoMedia & Integration Testing
Following a bottom-up approach the present service will be integrated into the definitive architecture once it has been unit tested.

Deliverables:

D4.1 Design document of the Synchronization & Communication service. Month 22
D4.2 Source Code & Tests of the Synchronization and Communication Service. Month 33

Work package number	WP5		**Start date / starting event:**			M15
Work package title	Multimedia Collaborative Content Creation & Deployment in Distributed Systems					
Activity type	Research & Technical Development					
Participant number	1	**2**	3	4	5	6
Participant short name	EMO	**FhD**	LAN	URL	C3	MED
P-m per participant	6	**18**	6	4	4	3

Objectives

- Design and development of a collaborative service for content interchange
- Develop services to be integrated in the ArcDecoMedia architecture for enabling search and flexible, secure sharing of content for the collaborative content creation process supporting e.g:
    - filtering of unauthorized content
    - a basic content protection approach
    - basic capabilities for communication between participating users
    - content and rights registration service for content protection, and monitoring / clearance of rights

Description of work

The activities performed under this WP are leading to the construction of services that integrated in the ArcDecoMedia architecture will facilitate collaborative creation of multimedia contents and deployment of them in Distributed Systems. The main research tasks to be developed in this WP are:

Task 5.1 Selection and extension of the best Content Distribution Strategy
In this task the appropriate P2P network will be chosen as a basis for the service for collaboration & content distribution. Other technologies will also be analysed.

Task 5.2 Design of the Collaborative Creation and Distribution Services
In order to provide basic content protection, and in order to control and monitor rights information within ArcDecoMedia, a content and rights registration service will be designed. Content and rights information will be uploaded to and registered with this component, authenticable licenses for sharing will be created and keys for access control will be generated and managed. The service will also track and manage related license and rights information, identify possible conflicts and inform the users about them.

It will also be designed a collaborative service for uploading, downloading, and sharing of content and metadata, and for content distribution used for installations. For that purpose, appropriate existing P2P selected in T5.2 will be enhanced as needed, based on the needs derived from the

requirement analysis. The service will include community features such as discussion forums, content and metadata rating and tagging, and features based on the requirements for the project. An important part of this work will be the development of an adequate peer application, which integrated various functionalities needed with respect to security, content authentication etc. As for P2P security, the following enhancements to existing developments will be specified and implemented:

- filtering of unauthorized content via white list filtering
- authentication of peers
- key management
- application of basic content protection
- basic capabilities for communication between participating users
- support for the exchange of user-created content and user-made metadata & annotations
- support for content integrity checks & authentication

In addition, we will investigate how differently encrypted versions of the same content can be efficiently shared.

T5.3 Development and Unit Testing of the Distribution and Collaborative Creation Services
Development and unit testing of the issues designed in the previous task.

T5.4 Integration of Services into ArcDecoMedia & Integration Testing
Following a bottom-up approach the present service will be integrated into the definitive architecture once it has been unit tested.

Deliverables:

D5.1: Design Document of the User, Content & Rights Registration Service and, Collaborative Creation and Distribution Service. Month 22
D5.2: Source Code & Test of the User, Content & Rights Registration Service and, Collaborative Creation and Distribution Service. Month33

Work package number	WP6		**Start date / starting event:**			M24
Work package title	Graphic Interface Service					
Activity type	Research & Technical Development					
Participant number	1	2	3	**4**	5	6
Participant short name	6EMO	FhD	LAN	**URL**	C3	MED
P-m per participant	3,5	4	4	**13**	3	0

Objectives

Designing, developing and testing an easy-to-use, easy-to-learn, modular and open service interface for the fast creation, integration deployment and control of the multimedia contents and installations.

Description of Work

It's extremely important to define an interface that let users easily configure and exploit the architecture proposed. The ArcDecoMedia project proposes an interface with the following characteristics:

- it must be open and extendable
- it must be a modular system that allows integration of new developments to the platform in real-time.
- it must provide scripting capability for the creation, parametrisation and weaving of components
- it must provide artefacts for the combination of contents

The architecture will also have the ability to integrate repositoryies of components as well as APIs for the creation of new multi-purpose components. The basic multimedia components the platform should provide are:

- **Input Components:** Camera Image Capture, Bluetooth communication, keyboard, mouse or joystick, MIDI, DMX, OSC, other sensors…
- **Processes Components:** CPU/GPU Image processing components, Computer Vision Integration components (e.g. OpenCV, GPUCV…), Simulation components (2D/3D physics).
- **Output Components:** Standard 2D/3D render, audio, high definition video, MIDI, serial, DMX, other actuators…

T6.1 Design of the graphic interface service
Design of the console for graphic development of the installations from several points of view: creator, controller/producer, exhibitor .The issues that shall be designed under this task are:

- Design of the interaction concept between the end-users and the final system incorporating the architecture.
- Design of the components repositories: graphical representation of components and interrelations.
- Design of the scripting utility for the creation of new components.

T6.2 Development and testing of the graphic interface service
Development and unit testing of the issues designed in the previous task.

T6.3 Integration of the graphic interface service into the ArcDecoMedia Achitecture & Integration Testing
Following a bottom-up approach the present service will integrated into the definitive architecture once it has been unit tested.

Deliverables:

D6.1: Design of the graphic interface service. Month 33
D6.2: Source Code & Tests of graphic interface service. Month 33

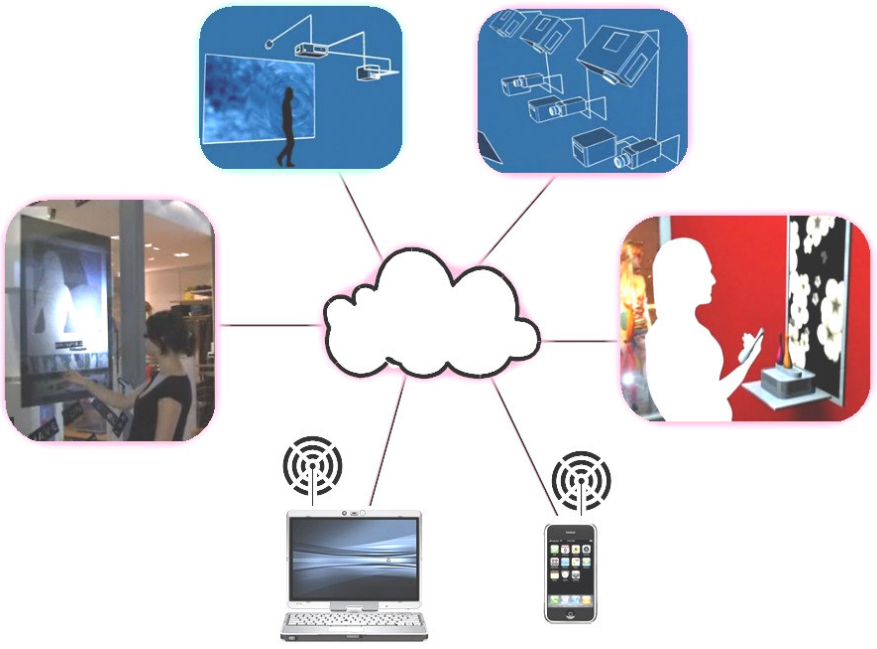
Work package number	WP7		**Start date / starting event:**			M28
Work package title	Demonstration of ArcDecoMedia					
Activity type	Demonstration					
Participant number	1	2	3	4	5	**6**
Participant short name	EMO	FhD	LAN	URL	C3	**MED**
P-m per participant	3	10	2	1,5	1,5	**7**

Objectives

Demonstrate the ArcDecoMedia Environment in 2 demonstration actions of different sectors.

Description of work

Validity of the ArcDecoMedia Environment will be demonstrated in 2 interactive multimedia applications of different sectors spread all over Europe. The images bellow mixes real and potential interactive installations designed by some of the partners in the consortium as an example of the types of demonstration actions that will be performed within the ArcDecoMedia project.



Task 7.1 Elaboration of Contents for the Demonstration Activities.
It's important to build multisource contents of high quality to demonstrate the validity of the different issues proposed in the Architecture:

- Contents will be produced by means of the collaborative artefacts/services implemented in the architecture, validating users, content and rights registration.
- Security over P2P will also be tested when using the collaborative services

Task 7.2 Demonstration in the Audiovisual Content Industry.
This demonstration will be led by Media+Space (Germany). This action will demonstrate the validity of the platform for:

- ease of integration of complex hardware without new programming requirements
- easily integrating different contents to create a single audiovisual product

Task 7.3 Demonstration in the Multimedia Industry.
This demonstration will be led by Emotique (Spain). This action is carried out to demonstrate the applicability of the platform in the industry. Some of the aspects that will be validated are:

- ease of integration with the newest replay technologies
- ease of integration of interactive capabilities in new generation displays (fixed and mobile)

Deliverables

D7.1 Demonstrator for the Audiovisual Content Industry: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator. Month 36

D7.2 Demonstrator for the Commercial Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator. Month 36

Work package number	**WP8**			**Start date / starting event:**		**M1**
Work package title	**Dissemination and Exploitation.**					
Activity type	**OTH**					
Participant number	**1**	2	3	4	5	6
Participant short name	**EMO**	FhD	LAN	URL	C3	MED
Person-months per participant	**12**	4	4	3	4,5	4,5

Objectives

The main objective of Workpackage 8 is to **assure maximum impact** of ArcDecoMedia results both in terms of **public awareness** and also regarding potential **results exploitation** as a major source of revenue and business opportunity to project consortium partners.

For this to be adequately accomplished, ArcDecoMedia will define in a very early stage a clear dissemination strategy and detailed dissemination plan for the whole project duration. Also at month 3 ArcDecoMedia will design a preliminary exploitation plan including detailed partners´ business strategies and IPRs. The exploitation plan will be further elaborated and refined as soon as distinct project results are generated.

The dissemination activities will be performed at three levels: local, national and European. The final objective is to reach a large target audience and EU constituency, including RTD stakeholders, IT solution developers and end – users in several user sectors. ArcDecoMedia will actively cooperate with running EU FP6 & FP7 RTD projects and also related Technology Platforms.

Description of work

Task 8.1. Dissemination & Networking strategy definition and Action Plan design.
This task will be led by EMOTIQUE in order to define the most sensible strategy to effectively disseminate project results while building and strengthening the so-called “sustainable network”. Once the overall strategy is defined, this task will be devoted to the design of a detailed dissemination **action plan**, which will be issued as the first version of the Plan for Using and Disseminating Knowledge (PUDK). This will include the definition of dissemination tools, the identification of the target audience and the definition of sets of impact indicators to assess dissemination effectiveness.

Task 8.2. Dissemination material preparation.
Once the "tools" are defined ArcDecoMedia will select the "how" to disseminate (the dissemination material). This material will include:

- Project web site,
- newsletters,
- papers,
- project brochure and

- other less conventional dissemination channels such as setting up of clinics and working groups or thematic events.

Task 8.3. Development of dissemination & networking activities.
During the development of this task, coordinated by EMOTIQUE, all partners will develop the activities designed to maximise project results visibility and potential feedback from network members and public in general. The activities will be performed within the extended sustainable ArcDecoMedia network. The actors beyond the research community will be involved through the dissemination activities, to help spread awareness and to explore the wider societal implications of the proposed work.

Task 8.4. Impact assessment.
The definition of sets of impact indicators to assess dissemination effectiveness will be done in Task 6.2. However, once a dissemination activity is performed, Task 6.4 will measure the impact of these actions in terms of number and quality of participants involved and response rate.

Task 8.5. Exploitation plan design.
The exploitation plan will have to regulate all partners' rights and duties. The exploitation plan will include the exploitation of knowledge and prototypes obtained during project development. This plan will also define exploitation agreement between ArcDecoMedia project partners and a Memorandum of Understanding.

Deliverables

D8.1.1 Dissemination & Networking strategy and plan as the first version of the PUDK (including first version of the web page). Month 3.
D8.1.2. Final version of PUDK. Impact assessment – Dissemination evaluation report. Month 36.
D8.2. Dissemination material. Months 6, 12, 24, 36.
D8.3.1-4 List of dissemination & networking events. Months 6, 12, 24, 36
D8.4 List of impact indicators. Month 18.
D8.5.1 Preliminary Exploitation Strategy. Month 6.
D8.5.2 ArcDecoMedia Exploitation Plan. Month 30.

B.1.3.4 List of workpackages

Work package No[1]	Work package title	Type of activity[2]	Lead partic. no.[3]	Lead partic. short name[4]	Person-months	Start month[5]	End month[6]
1	Project Management & Plan for Quality Assurance.	MGT	1	EMO	14	1	36
2	Requirements Gathering and Analysis	RTD	1	EMO	23,5	1	6
3	Architectural Design	RTD	2	FhD	22	7	14
4	Multimedia Collaborative Content Control in Distributed Systems	RTD	3	LAN	52	15	33
5	Collaborative Multimedia Content Creation & Deployment in Distributed Systems	RTD	2	FhD	41	15	33
6	GUI Service	RTD	4	URL	27,5	24	33
7	Demonstrations of the ArcDecoMedia Platform	DEM	6	MEDIA	25	28	36
8	Dissemination & Exploitation	RTD	1	EMO	32	1	36
	TOTAL				**237**		

[1] A work package is a major subdivision of the proposed project with a verifiable endpoint normally a deliverable or a milestone in the overall project.
[1] Workpackage number: WP 1 – WP n.
[2] Please indicate one activity per work package:
RTD = Research and technological development (including any activities to prepare for the dissemination and/or exploitation of project results, and coordination activities);
DEM = Demonstration;
MGT = Management of the consortium;
OTHER = Other specific activities, if applicable in this call
[3] Number of the participant leading the work in this work package.
[4] The total number of person-months allocated to each work package.
[5] Measured in months from the project start date (month 1).
[6] Measured in months from the project start date (month 1).

B.1.3.5 Deliverables List

Deliverable	Deliverable name	WP Nr	Nature	Diss. Level	Delivery Date
D1.1.1-4	6 Monthly Progress Report	WP1	R	R	M6, 12, 18, 24
D1.1.5-6	Yearly Management Report	WP1	R	R	M12, 24
D1.1.7	Final Report	WP1	R	P/R	M36
D1.2.1	Project Quality Plan	WP1	R	R	M3
D1.2.2-4	Financial Reports and Final Audit	WP1	R	R	M12, 18, 24
D2.1	Existing Practices and State-of-art	WP2	R	P	M3
D2.2	ArcDecoMedia Requirements.	WP2	R	R	M6
D2.3	Future uses of the ArcDecoMedia Environmen (Draft).	WP2	R	PU	M18
D2.4	Future uses of the ArcDecoMedia Environment (Definitive).	WP2	R	PU	M36
D3.1	Architectural Design.	WP3	R	PU/R	M12
D4.1	Design document of the Synchronization & Communication service	WP4	R	R	M17
D4.2	Source Code & Tests of the Synchronization and Communication Service	WP4	Sw	R	M25
D5.1	Design Document of the Collaborative Creation and Distribution Services	WP5	R	R	M11
D5.2	Source Code & Test of the Collaborative Creation and Distribution Services	WP5	Sw	R	M17
D6.1	Design of the graphic interface service	WP6	R	R	M17
D6.2	Source Code & Test of the graphic interface service	WP6	Sw	R	M26
D7.1	Content for Demonstrators	WP7	Prot	Prot	M34
D7.2	Demonstrator for the **Audiovisual Content** Industry: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator.	WP7	Prot	PU/R	M30
D7.3	Demonstrator for the **Commercial Sector**: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator.	WP7	Prot	PU/R	M32
D8.1.1	Dissemination & Networking strategy and plan (PUDK V1)	WP8	R	PU	M3
D8.1.2	Final version of PUDK. Impact assessment – Dissemination evaluation report	WP8	R	R	M36
D8.2	Dissemination Material	WP8	O	PU	M6, 12, 24, 36
D8.3.1-4	List of dissemination & networking events	WP8	R	PU	M6, 12, 24, 36
D8.4	List of impact indicators	WP8	R	PU	M18
D8.5.1	Preliminary Exploitation Strategy	WP8	R	C	M6
D8.5.2	ArcDecoMedia Exploitation Plan	WP8	R	C	M40

With regard to P/R deliverables, basic concepts will be publicly available while specific content will remain restricted to consortium partners
All demonstration activities will be public except referring to the creators' contents which will be subject to authoring rights

B.1.3.6 List of milestones

Main milestones of the project are:

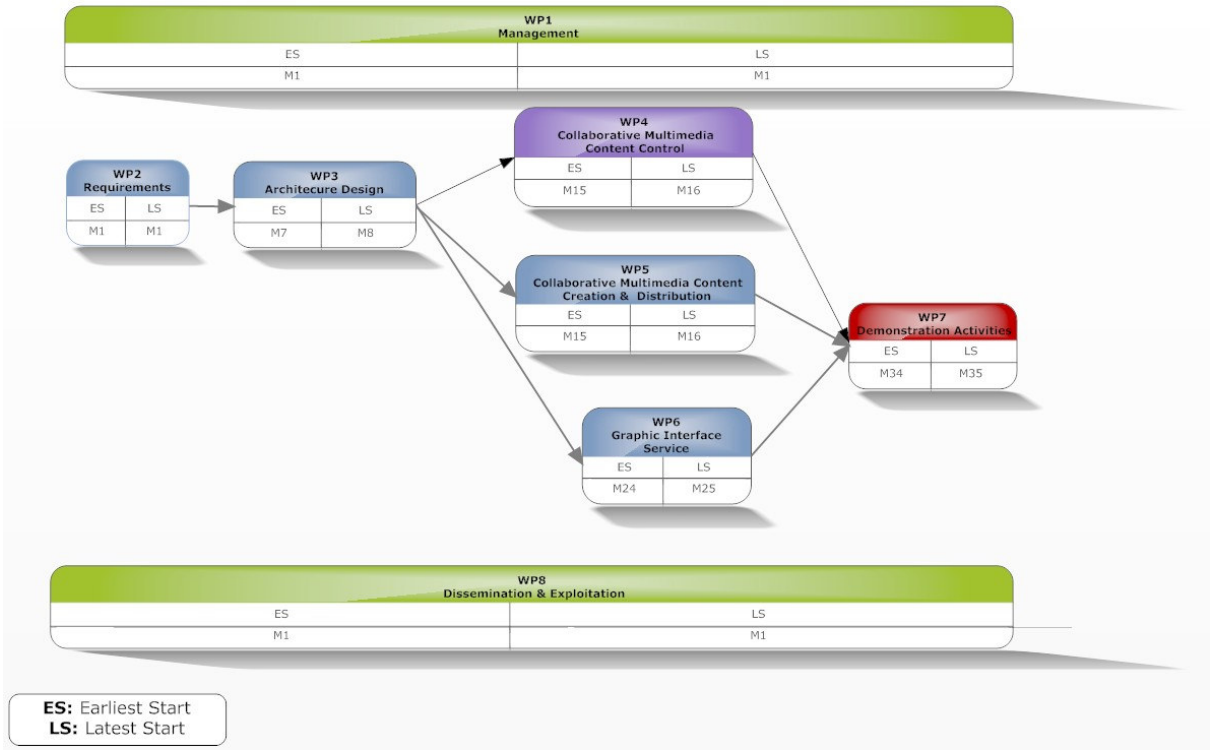
Nr	Milestone Name	WP	Date	Method of Verification
Mlstn1	ArcDecoMedia Architecture Requirements Approved by all partners and delivered to the Commission	WP2	M6	Source documents ready (D2.1, D2.2, D2.3), Requirements document (D2.4) and Requirements Review Report
Mlstn2	Architectural Design Approved by all partners and delivered to Commission	WP3	M12	Architecture Document Ready (D3.1) and Architecture Review Report
Mlstn3	Design of the ArcDecoMedia Services approved by all partners and delivered to Commission	WP4, WP5, WP6, WP7	M22	Design documents ready (D4.1, D5.1, D6.1) and Design Review Reports
Mlstn4	Deployment of the ArcDecoMedia architecture and Validation	WP4, WP5, WP6, WP7, WP8	M30	Source Code ready, Unit and Integration Tests Executed (D4.2, D5.2, D6.2) and ArcDecoMedia Environment validated during demonstration actions (D7.1, D7.2, D7.2).

B.1.3.7 *Summary of staff effort*

Partic. Nr	Partic. Short Name	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	Total PMs
1	**EMO**	9	11,5	1	8	6	3,5	3	12	**54**
2	**FhD**	1	2	8	4	18	4	10	4	**51**
3	**LAN**	1	2	8	18	6	4	2	4	**45**
4	**URL**	1	2,5	1	7	4	13	1,5	3	**33**
5	**C3**	1	3	3	8	4	3	1,5	4,5	**28**
6	**MED**	1	2,5	1	7	3	0	7	4,5	**26**
	Total	**14**	**23,5**	**22**	**52**	**41**	**27,5**	**25**	**32**	**237**

B.1.3.8 Pert diagram

The sequence of activities which will be performed during the scope of the project aims at ensuring achievement of the objectives and minimisation of some of the main risks. The paths, reflected in the workplan structure, are composed of the following activities:



The second and third work packages are oriented to obtain the basic requirements and technical specifications of the ArcDecoMedia environment: RTD and industrial partners, as well as end-users will be involved in this relevant activity. Once this basis is settled, WP4 to WP6 will be executed almost in parallel by all the RTD partners depending on their area of expertise:

- Multimedia Content Distribution and Security: Fraunhofer

- Synchronization and communication Service: Lancaster
- Collaborative Platform: C3
- Graphic Interface Service: La Salle

At the end of these activities its result will be validated in 2 demonstration activities led by MEDIA+SPACE.

B.1.3.9 Risks and associated contingency plans

Since the objective of the ArcDecoMedia project is to develop a new architecture approach for the deployment and control of complex multimedia contents and applications, the project includes a number of risks, some of which are listed below:

1. The key **RTD challenges** are in achievement of proper strategies in the 3 major areas of the project (synchronization & communication, deploymen and control in distributed multimedia, including IPR and security issues of the contents, collaborative work in the multimedia community). All aspects of the complex RTD matter will be properly attacked by the most competent partners for each domain but also by developing the synergies of particular research components to achieve an integrated holistic solution. The consortium will approach this issues from the very beginning of the project, and this aspects will be led by partners with high expertise in technologies addressed.

2. In order to keep tight connections of research activities with envisaged real industrial application, the work will be **based on 2 demonstration activities** which will define the framework of the RTD concepts to implement. Realisation of these demonstrators in the end-users will assure a continuous observation of the validity of the results. It will assure suitability of the developed technical solutions.

3. The risk of the ArcDecoMedia architecture not delivering adequate results will be avoided by focusing on scenarios with well encapsulated activities, allowing **stepwise introduction of the advanced results**. Furthermore, ArcDecoMedia will apply mature technologies, with proven reliability, to back-up the innovative technical solutions. Finally, ArcDecoMedia will elaborate, in strong co-operation with all actors involved in the foreseen scenarios, a well-defined testing and introduction procedure including staff training to further minimise the risk.

4. Keeping in mind the complexity of the solution to be developed the time for the efficient development and testing of the ArcDecoMedia results is critical. To minimise this risk, the project will assure necessary monitoring, early testing, and feedback from the end-user and early accumulation of the knowledge needed to build and test the applicability of the solution in industry.

5. In order to reduce the development risks associated with the rather ambitious development objectives of the project, enabling the focus on key innovative aspects, ArcDecoMedia will strongly re-use results from other projects and market available tools.

As a top risk-minimising strategy the continuous tracking and tracing of the project results will be applied, incorporated through the measurement of results and mapping to the planned achievements in terms of time and measurable achievements. At the predefined points of the project (i.e.

milestones) a current results analysis will be carried out as a support to the decision on further project strategy: continue, based on the applied S&T approach, which guarantees the achievement of the target objectives, or apply an appropriate falling-back strategy, previously considered by the consortium.

B.1.3.10 Measurement of results

In order to ensure reliable validation of the ArcDecoMedia results a number of metrics will be defined to enable a quantitative assessment of the project progress and the results achieved. Some initial metrics and target values have already been defined, and will be further elaborated within the conceptual phase of the project. These quantitative metrics include:

1. Business metrics,

2. Technical metrics (requirements upon the services before/after ArcDecoMedia):
    - Time to develop multimedia content
    - Time to integrate interactive technologies
    - Time to integrate audio/video technologies
    - Time to deploy interactive multimedia technologies in remote location

3. Metrics related to S&T objectives.

In order to provide appropriate procedures for self-assessment throughout the project, the following strategy will be applied:

1. The metrics related to the ArcDecoMedia architecture will be assessed within the early phase of business requirements gathering. It is expected that these initial tests will show that at least 50% of the expected target values can be achieved.

2. The system prototypes will be installed in the industrial environments to enable testing the services and technologies under the real conditions (real art performances, real complex interactive installations for the commercial sector, etc). This will enable measuring the success of the environment, and it is expected that at least 70% of the target values can be achieved.

3. In the validation phase based on the full prototypes the measurement of all defined metrics will be continued, according to the 2 target scenarios, especially the measurement of business benefits, aiming to achieve all defined targets.

The quantitative results of this evaluation process can be used as marketing arguments for further exploitations activities for the ArcDecoMedia solutions. In order to perform the above measurements, it's of high importance that all end-users have records on previous similar activities, which can serve as reference values for measurements of the technical and business improvements. The project will organise different measurements, e.g. time & cost for the creation and deployment of a standard multimedia interactive application, etc.).

B.2 Implementation

B.2.1 Management structure and procedures

B.2.1.1 Project Management

Effective Project Management requires effective decision making, clear external communication, operational internal communication, and effective administrative and technical control. Based on this, ArcDecoMedia project management strategy is illustrated in the following figure:

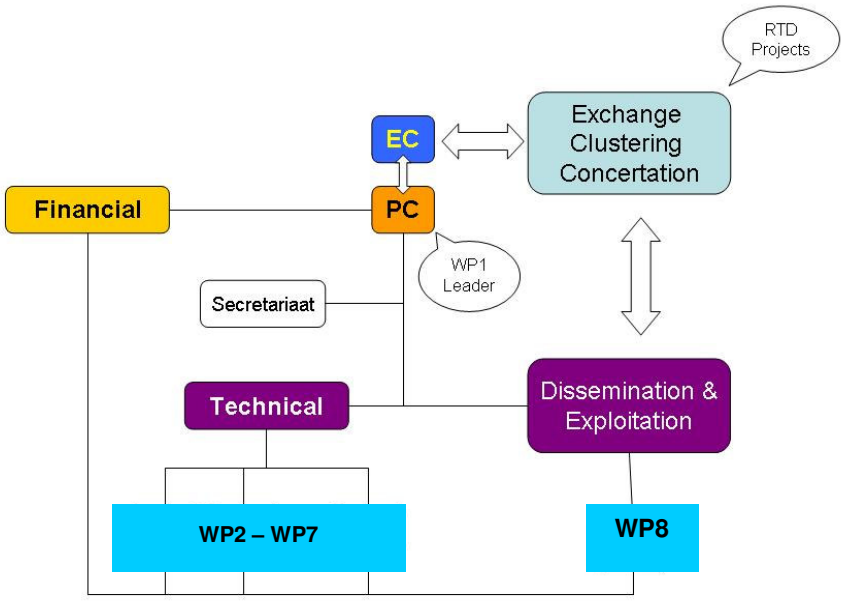


Figure 2.1-1: Management Organisational Scheme

The proposed project management approach guarantees transparency and commitment to all engaged partners and thus facilitates an unobstructed and successful project evolution. It assures that ArcDecoMedia meets its entire objectives on time, on budget, and with supreme quality results.

ArcDecoMedia Project Intranet
The ArcDecoMedia project will provide the necessary tools to facilitate **communication among partner**s. During the first months of the project it will be analyzed several environments for documents and knowledge sharing, such as **wiki platforms**, **work-group environments**, etc.

B.2.1.2 Project bodies and management functions

Project Coordinator
The Project Coordinator is responsible for the overall management, communication, and coordination of the entire project and to ensure that the scientific and technological objectives of the project are met. The project coordinator will also continuously monitor the financial aspects of the project and ensure expenses continue together with project progress. The coordinator will also develop and provide the EC project progress reports. A special emphasis within their responsibilities is to assure in accordance with the WP Leaders the overall integration of the single workpackages. The Project Coordinator will be responsible also of Workpackage 1: Project Management & Plan for Quality Assurance. The coordinator of the project has a wide experience not only in European Projects but also in Software Quality Assurance projects. This knowledge will be applied in order to obtain the desired results in the technical work packages (from WP2 to WP7).

Dissemination and Exploitation Manager
The Dissemination & Exploitation Manager is responsible for the execution of the overall exploitation and dissemination plan of the project and supports the partners in setting up their individual business plans in order to exploit the project results, as well as the dissemination plans in order to disseminate project results to wider scientific and public community. The Dissemination & Exploitation Manager will be responsible for project external relations as an independent service. This will deal with all external requests (i.e. questions on project concept and results through the Internet, relation to the Press and the Media), including follow-up of clustering and concertation activities with other projects and of activities of relevant standardisation bodies and International Fora.

Among The Dissemination & Exploitation Manager duties, it should be highlighted that this manager is responsible to manage the knowledge produced during the project lifecycle and to assess the opportunity for applying for patents, trademarks or declaring copyrights. The Dissemination & Exploitation Manager will also be responsible for Workpackage 8: Exploitation, Impact, Assessment and Dissemination.

Financial Manager
Financial department of the coordinator will lead carry out the financial project management. He/she will directly report to the Project Coordinator and the Coordination Team.

His/her responsibilities will include:
- Collecting and checking the completeness of Periodic Cost Statements by all partners and submitting them to EC.
- Making and tracking of payments and Budget allocations.
- Making sure that audit certificates are provided in time and quality by each of the partners at the time of financial reporting.

The Financial Control procedure will monitor the correct expenditure of the budget assigned. An Annual Costs Statement will be performed. There will be also performed internal reports, which provide feedback over Person-Months spent per partner, each 6 months.

Workpackage Leaders
WP Leaders are responsible for managing their WP as a self-contained entity. The scope of their responsibilities includes coordinating, monitoring, and assessing the progress of the WP to ensure that output performance, costs, and timelines are met. In cooperation with the Project Coordinator and other related Workpackage Leaders of the same subproject or other subprojects, they are responsible for the integration of their results into succeeding workpackages or tasks.

Steering Committee
The Steering Committee is formed by the Project Coordinator, the Dissemination & Exploitation Manager, the WP Leaders and the Financial Manager.

The Steering Committee shall be responsible for the planning, execution and controlling of the project. The Steering Committee is expected to be the projects' driving force. Committee Members are permanent for the project duration, except for the case when they wish to leave the Committee themselves or because of EU intervention.

They shall be in charge of supervising the project progress and deciding upon all relevant technical and administrative issues, such as: redirection of work in an WP, major transfer of resources across WPs or Partners (over 20%), technological choices, changes in time plans, inclusion of a new Partner, substitution or exclusion of an existing Partner, conflict resolution among different WPs.

Among their duties are:

- Administration, financial and scientific coordination activities.
- Implementation of all action plans.
- Establishing a budget and schedule-controlling system.
- Implementation of a quality assurance system.
- Providing clear guidance on Intellectual Property issues.
- Developing and maintaining a communication and reporting attitude and providing project reports and cost statements as requested by EC.
- Creation of efficient team structures to minimize the number of meetings while being flexible.

All Committee Members will have a single vote. In case of equal votes, the vote of the Coordinator shall be the decisive one. This Group will meet once every six months with the participation of all WP Leaders. If needed, additional ad-hoc steering committee meetings could also be appointed to discuss any specific issue that might appear during the project execution.

Plenary Board
The Plenary Board consists of the representatives of all Partners, each one having 1 vote. It is chaired by the Coordinator, who again has the decisive vote in case of equal votes. This Board will only meet once per year to review and plan the project's work and progress. Any partner may raise issues. Minor issues (according to the Coordinator) may be discussed and decided within this Board. Major issues will be transferred to the Technical Committee level.

B.2.1.3 Project decision procedure

Decision Making Process

Decisions will normally be made by the responsible team members, and organization bodies based on the current document, as stated in the Grant Agreement, the Consortium agreement, the Description of Work (DoW) and the Quality Plan, as communicated regularly, and the individual WP or Task plans. In case there is a dispute between team members, an escalation procedure must be followed, as presented in the Conflict Resolution section.

Conflict Resolution
In the course of the project the consortium will have to agree on and develop technical, scientific and commercial ideas and specifications. Usually, agreement will be reached first by informal contact, followed by official confirmation via electronic mail, letter or agreed written minutes. For important issues, the agreement may take the form of a short report that needs to be signed by those responsible for decision-making. Technical issues/conflicts within given contractual commitments that do not involve a change of contract, a change of budget and/ or a change of resources/ overall focus will be primarily discussed/ solved on the WP level.

If the decision being made is unacceptable to partners found in the minority positions, the resolution of the conflict will be escalated as summarised in the following steps:

- First, the implementation team will inform the WP leader for the conflict occurred.
- The WP leader will organize the WP team meeting and the issue will be discussed. In case of agreement the team will inform the Project Coordinator (PC).
- If no decision is taken the WP leader will inform the PC in order contact with the responsible persons and try to resolve the conflict.
- In case of agreement the PC will inform the Plenary Board. Otherwise the issue will be escalated to the Steering Committee who will have the authority for the final decision. The final decision must be accepted by all parties.

B.2.1.4 Communication among partners

Information flow
Information flow within the Project will be ensured by:

- The exchange of internal technical and business documents.
- Notification of relevant new publications in the literature, or by the standard bodies.
- Reports from external meetings.
- Information available to the project partners through the web site (project deliverables, technical documents, etc.).

All technical documentation generated by the project should be exchangeable in electronic format, according to set of guidelines to be agreed and will be described in the **Quality Management Plan** (guidelines for deliverable naming & classification).

Exchange of information will mainly occur by e-mail and file transfer over Internet. The basis of the project communication lays upon the adoption of two mailing lists, including one for technical and business development matters and another for administration and evaluation purposes.

Telephone and fax will be used for urgent needs only. Urgent correspondence over e-mail will be sent with a request for explicit acknowledge. Ordinary mail will be used for strictly formal

correspondence, i.e. when executive signatures are required. Adherence to the agreed communications standards will be enforced by the Project Coordinator.

Meetings
The Steering Committee will meet every six months to monitor project progress. Plenary Board meetings will take place once a year. WP technical meetings will take place whenever required.

All meeting arrangements will be communicated to all WP responsible involved in the specific task and to the project coordinator, who will undertake to optimise the timing and location of meetings, by organising more than one meeting in parallel (e.g. coinciding with formal project review meetings), thus minimising travel costs.

Measurement of Project Progress
Control reports should be submitted by each partner every three months to the Project Coordinator by the 1st week of each 3rd month. They should list all contributions, publications and meeting attendance details which can help in understanding the provided effort and cost figures.

Periodic progress reports to Commission: To document the work progress and general management issues, six monthly progress reports will be issued to EC project officer. In addition to this, every year the Annual progress reports will be forwarded to the Commission, These reports, in addition to a detailed description of project technical progress, will include specific chapters related to financial managerial aspects where all resources invested in the project will be detailed and any possible deviation will be highlighted and justified if necessary. In the case major incidents are identified either on technical or financial matters, the consortium will provide the EC with a suggested contingency plan to solve the issue.

B.2.1.5 Project Quality Assurance

In Workpackage 1: Project Management and Plan for Quality Assurance (PQA) will define all quality management related activities necessary to ensure the adequate implementation of the project plan and to assure the quality of the project results.

The PQA will establish agreed definitions of procedures for acceptance and quality control. The procedures to be described in the PQA will address those activities needed for the smooth and effective evolution of the project across its lifecycle, and will be oriented to achieve:

- Quality of the work performed.
- Quality of the documentation generated during project performance.

In order to assure high quality in the work performed, the PQA will define a methodology and procedures to be applied in line with ISO 9001 requirements, though a certain degree of flexibility will be retained due to the specific needs of a research project. In particular they will refer to:

- Requirement specifications and quality objectives definition
- Organisation of the working team
- Roles and responsibilities of each participant
- Control actions planned
- Time schedules

In addition, the PQA will define whenever necessary any contingence/corrective plan. Contingency plans will include a clear statement of the incident encountered, proposed measure and detailed activity plan, responsible/s partner/s to implement the activity and potential impact to the overall project execution in terms of project cost, duration etc.

If any problem arises in the performance of the obligations of the partners, related to the prompt execution of their work, correction measures should be taken (this is one of the Project Coordinator's responsibilities). At all times, resources claimed by the project partners should correspond with the actual work performed during the reporting period and will be subject to the approval of the PC.

Corrective measures taken to address problems related to the fulfilment of the obligations of the partners may lead to amendments to the Project Plan. Major changes in the Work Plan, project budget or amendments to the Contract have to be proposed by the Project Coordinator and need a written approval by all contractors in accordance with the approval of the EC.

To assure the high quality of the documentation generated during project performance, two specific measures will be taken:

- Definition of harmonized templates to be used during documentation and reporting stage.
- Internal quality control of the documentation generated. Internal reviewers responsible for final quality checking of all deliverables and major documents will be appointed. The internal review template will be attached to each document.

Both measures will facilitate the adherence of ArcDecoMedia documentation with the EC quality standards of deliverables and EC acceptance criteria.

The Quality Plan will be a binding document and will have to be approved and signed by all partners. When the Quality Plan is not in accordance with the Contract, the Contract will be perceived as the final binding document.

B.2.1.6 Plan for using the knowledge

Regarding the Management of Knowledge and Innovation activities, the Dissemination/Exploitation Manager will be in charge of maintaining a schedule of knowledge produced during the Project and the opportunity for applying for patents or declaring copyrights will be assessed.

This activity will encompass:

- Description, in collaboration with the Plenary Board, of the innovative elements of the R&D work conducted in the project;
- Searching through existing patents' databases and other scientific databases for similar development;
- Reporting to the Project Coordination and to the Steering Committee about the "innovation" status and proposing registration of patents.

Depending on the decision of the Steering Committee and of the involved Technical Teams, the identified opportunity could then be:

- □ Disseminated without becoming registered as a patent;
- □ Registered as a patent by the Consortium member which has developed the innovation;
- □ Registered as a patent by the Project Coordinator on behalf of the Consortium for joint innovations.

IPR Issues and Consortium Agreement

For every partner of the ArcDecoMedia consortium, it is very important to have explicit rules on how to access Pre-Existing Know-How and foreground knowledge and how to ensure the protection of intellectual property. Therefore, ArcDecoMedia partners have drafted a Consortium Agreement including IPR Issues to support common and individual dissemination and exploitation strategies in line with the relevant Articles on IPR of the Grant Agreement.

The ArcDecoMedia Exploitation Agreement will be developed taking into account the following preliminary agreements:

Concerning exploitation of the project results, it is the understanding of the consortium that knowledge and pre-existing know-how will be made available to the Consortium members in favourable conditions if they are necessary to perform the research and relative work in this project.

The placement of Pre-Existing Know-How into the project will be detailed in the Appendix of the Consortium Agreement. Herein, every single partner is entitled to describe their own Pre-Existing Know-How.

Foreground knowledge is owned by the beneficiary generating such information or result. Each beneficiary shall make available their foreground knowledge, on a royalty-free basis, to other beneficiaries, to the extent that such information is necessary for the production of their own foreground knowledge within ArcDecoMedia. If it is not possible to determine exactly the ownership of that foreground knowledge, i.e. several beneficiaries participated in that, specific development ownership will be shared by the pro ratio effort invested by each beneficiary.

Pre-existing know-how and foreground knowledge will be made available, on a royalty-free basis, to the other project partners for dissemination, research and academic purposes in respect to the intellectual property rights of the partner generating this knowledge. Pre-existing know-how and foreground knowledge will be made available to the other project partners for exploitation purposes at favourable conditions, with respect to the normal commercial conditions applied by the granting partner.

The Project Coordination Team, after collaborating with the Dissemination & Exploitation Manager will develop the agreement on IPR issues to be included in the Consortium Agreement. It will regulate obligations and rights of the participants, and will be prepared and signed by the partners no later than the contractual project start date. The Consortium Agreement makes explicit reference to important administrative points such as decision procedures within the project, risk management strategies, legal aspects regarding software to be used/produced in the project, trademarks, patents and rights of each partner in the exploitation of results. The Consortium Agreement specifies administrative processes, defines access rights to Pre-Existing Know-How, knowledge, dissemination rules, and IPR. Legal documents such as the Consortium Agreement as well as use and exploitation plans are envisaged to minimize the conflict potential within the consortium and thus will be adapted to the typical requirements of the consortium members of ArcDecoMedia.

B.2.2 Individual participants

B.2.2.1 Emotique

Emotique is a technology-based new company committed to the creation of **multimedia services and contents** for **marketing** and **leisure** sectors, with own creative and productive processes, emphasizing technical innovation in all the services they provide.

Regarding the European experience of Emotique, they have been part of the European project **Sidereus Nuncius** funded by **European Union programme Culture 2000** together with **Fabbrica Europa (Italy)**. The project to create a new media installation inspired by the Virgo laser interferometer (Virgo MA 49-100/04) which is a high precision system created by the Italian National Institute of Nuclear Physics (INFN) and the French National Centre for Scientific Research (CNRS).

Since its creation in 2004 Emotique:

- has conceived more than **50 complex multimedia installations** for the marketing and leisure sectors,
- has organized and presented almost a **100 art & technology related performances** in more than 15 countries
- has created several **multimedia content projects** for the Culture sector,

Some of the systems Emotique develop are:

- **Reactive Audiovisual Systems:** interactive projection systems on any type of surface
- **Customized Audiovisual Systems:** Interactive 3D movie creation for cell devices in which one or more user get to play the character by means of an automatic and instant system, moving, talking, and gesturing like real actors. The customized movie can be sent to the user's phone, to the email or downloaded through a website.
- **Centralized Audiovisual Systems:** system that allows to create a tri-dimensional and virtual space where users can interact, generating the sensation of being inside a specific ambience or space.
- **Other Software Developments:** integration of new devices both software (artificial vision, facial recognition, 3D environments,…) and hardware (PDA's, light controls,…) in order to build professional systems fit to the clients' requirements providing innovation and reliability. Emotique has implemented systems such as:
    - One-person controlled synchronized system for lights, audio and video.
    - Facial detection system for video games interaction.
    - Synchronized multiscreen systems in 3D environments.
    - Audiovisual systems control by means of an electronic diary (anyone in the audience may control audiovisual changes in an event through a PDA)
    - Virtual instruments by movement analysis.
    - Interactive visual systems capable of integrating 3D environments, images…

Bosch, IKEA, Vueling, San Miguel, Ballantines, Catalan Institute of Technology or Banyoles Museum are some of Emotique's customers.

Emotique has a multidisciplinary team formed by artists, software, electronic and mechanical engineers that allow them to overcome the most demanding projects from their customers. Furthermore, before the creation of Emotique its founders participated in several international complex successful projects as **Sidereus Nuncius**.

Short profile of the staff members/key experts:

Aitor Elorriaga has a Computer Science Bachelorship from Deusto University. Since 2007 plays the role of Research and Innovation Manager in Emotique as an In-House Consultant. Aitor has participated in EU collaborative projects since the 5th Framework Programme as Technical Advisor, Researcher and Coordinator. He has been an evaluator for DG-INFSO and DG-RESEARCH, and reviewer of three projects for DG-RESEARCH during the 6th Framework Programme. His area of expertise is Software Engineering and Software Quality Assurance, having assessed important international companies, participated in several international conferences (QA Test & Quality Week) as speaker and invited chairman.

Alvaro Uña (PhD), cofounder of Emotique, completed his doctorate studies in Arts with the thesis *"Cyborgs and their representation in Arts. Technological Policies of the human body"*. He began his professional career in 1996 as a Graphical Designer developing graphical and interactive material for several companies. In 2000 he began developing his work in relevant art installations with a high technological component. In 2004 he creates Emotique together with Joan Coll to produce their own artistic performances and give service to companies in the Marketing and Arts sector.

Joan Coll, cofounder of Emotique, completed his studies in Computer Science-Multimedia Speciality at La Salle University. He also has arts, music and mathematics studies. During his professional career he's been working as Software Programmer, Software Project Manager of Multimedia projects and artistic installations, Teacher at La Salle Univeristy, among other artistic and technical activities. In 2004 he creates Emotique together with Alvaro Uña to produce their own artistic performances and give service to companies in the Marketing and Arts sector.

Alex Guevara, completed his studies in Computer Science-Multimedia Speciality at La Salle University. Nowadays he is the Software Project Manager in Emotique since 2005. Alex has a wide experience on multimedia and game design and programming, being involved in very relevant projects for several customers since 1999.

B.2.2.2 *Fraunhofer IDMT*

Fraunhofer IDMT Institut Digitale Medientechnologie

The **Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V.** (FhG) is Germany's leading non-profit research organisation of currently 58 institutes for applied research focusing on different research areas. Fraunhofer represents a link between science and industry, i.e. between research and application of its results. In total it has approximately 13 000 employees and an annual research budget of about one billion Euro.

The Fraunhofer Institute for Digital Media Technology IDMT has been founded in January 2004 as the 58th Fraunhofer Institute in Germany. Fraunhofer IDMT focuses on the

development of new media technologies for professional markets as well as for the home entertainment sector. Its focus is on virtual acoustics, metadata and distribution technologies, authoring systems, media security as well as audio coding for special applications. About 50 full-time employees along with the same number of students are working at a variety of research projects. The institute is headed by Professor Karlheinz Brandenburg. Brandenburg received the German Future Award for the development and commercialization of the MP3 music format at the Fraunhofer Institute for Integrated Circuits together with his colleagues from Fraunhofer IIS in Erlangen Harald Popp and Bernhard Grill in 2000. In May 2004, he was honoured with the "IEEE Masaru Ibuka Consumer Electronic Award" for major contributions to digital audio source coding.

The Metadata department of Fraunhofer IDMT possesses, among others, wide knowledge and expertise within the following areas: audio signal processing, metadata formats, audio and video feature extraction and fingerprinting, automatic music transcription, multimedia search and retrieval, content aggregation and distribution, P2P, trust and authentication, privacy, DRM alternatives, authoring systems, interactive AV applications & services, etc.
Fraunhofer IDMT contributed and contributes to several national and EU projects (CARROUSO, SemanticHIFI, PRIVACY4DRM, MetaStoRe, PHAROS, THESEUS).

Short profile of the staff members/key experts:

Dipl.-Ing. Uwe Kühhirt studied Electrical Engineering at Technical University Ilmenau (Germany), from where he received a Diplom-Ingenieur degree (equ. M.Sc.) in 1997. He has been working at the Institute of Media Technology (director Prof. Dr. Karlheinz Brandenburg) at the same University as a researcher in the field of interactive audiovisual applications using the MPEG-4 standard since then. He has been giving lectures on Interactive Media and Multimedia Tools at TU Ilmenau. He is author of the specialist book "Interactive Audiovisual Media" (in german language) published by Hanser Publishers in 2007. Uwe Kühhirt is working in the work package Interactivity Issues in the Network of Excellence "3DTV: Three-Dimensional Television - Capture, Transmission, Display", which is funded by the European Commission 6th Framework Information Society Technologies Programme. His Ph.D. thesis is titled "Authoring of object-based AV applications". In 2005 he joined the Fraunhofer Institute for Digital Media Technology IDMT in Ilmenau and took over the management of the Authoring Systems group. His working fields are services for digital television, interactive AV applications and authoring systems.

Dipl.-Ing. (FH) Christian Dittmar studied electrical engineering with specialization in digital media technology at the University for Applied Sciences in Jena from 1998 to 2002. In his diploma thesis, which he elaborated at the Fraunhofer Institute for Digital Media Technology Ilmenau, he investigated into Independent Subspace Analysis as a means of audio signal analysis. Subsequent to his successful graduation he joined the Fraunhofer IDMT Ilmenau in early 2003 to work at the Metadata department. Christian Dittmar contributed to a number of scientific papers in the field of music information retrieval and automatic transcription. In 2005 he participated in the MIREX contest category automatic drum detection. Since late 2006 he is Semantic Metadata Systems group manager at Fraunhofer IDMT.

Dipl.-Kulturw. Patrick Aichroth studied Geology (minors: Physics, Computer Science) and International Cultural and Business Studies at the Universities of Tübingen and Passau. His

diploma thesis and internships evolved around digital music distribution and computer music. After working several years as a freelancer (course instructor, programming), he became researcher at the Fraunhofer Institute for Digital Media Technology in Ilmenau in 2003, focusing on digital distribution, security and solutions to the "digital dilemma". Since 2006, he is manager of the Media Distribution and Security group at Fraunhofer IDMT.

B.2.2.3 Lancaster University

Lancaster University's Computing Department is an internationally renowned team of researchers investigating all aspects of **communications and distributed systems**. Its constituent researchers are particularly interested in contemporary challenges in this area, including support for **user-centric services** over wireless mesh networks, the **security challenges of mobility/ubiquitous computing** and problems arising from the increasing levels of heterogeneity exhibited by such systems. One of Lancaster's great strengths, as acknowledged by the International Review of UK Research in Computer Science, is the focus on pragmatic systems research. Another great strength is the critical mass of the team and the coverage of a broad range of technical areas from the application through the middleware to the underlying (highly heterogeneous) network. The Computing Department is now part of InfoLab21, a Lancaster University initiative, with major funding from the North West Development Agency and the European Regional Development Fund, to establish a world-class Centre of Excellence for research, development and commercialisation of Information and Communication Technology (ICT). A key aim of this Centre is to promote and accelerate technology transfer between the ICT research in the University and the local and regional industry, especially small and medium sized enterprises (SMEs).

Short profile of the staff members/key experts:

Adrian Friday is a senior lecturer in the Computing Department. A founder member of the Department's Mobile Computing Group he has managed numerous projects in the area of distributed systems for mobile and ubiquitous computing and disseminated the results of his research widely in international conferences and journals, with over 90 peer-reviewed publications to date. His recent work has focused on distributed systems support for networks of interactive public displays and mobile service creation and authoring. He contributes actively to the research community and was the General Chair of IEEE WMCSA 2004, PC chair of Ubicomp 2006 and PC chair of Pervasive 2009.

Nicholas Race is a Senior Lecturer within the Computing Department at Lancaster University and has over 12 years of experience working on EU projects. He works jointly with Computing and the Information Systems Service (ISS) under the umbrella of the Network Research and Special Projects Unit (NRSP). His research interests lie within the areas of mobile and ubiquitous computing, multimedia content delivery and autonomic wireless mesh networks. He is a technical programme committee member for many international conferences and workshops, including IDMS, MIPS, MMNS, ICETE, WINSYS, GridNets, GOBS and MCCSIS. He has received both the University's Commercialisation Prize (for overseeing the development of the IPv6 protocol stack with Microsoft) and the Community Prize (for the ongoing work in Wray village).

Dr. Andreas Mauthe is a Senior Lecturer at Lancaster University and has been working in the area of distributed and multimedia systems, content management and content distribution for more than 15 years. Prior to joining Lancaster University, he was heading a research

group at the Multimedia Communications Lab (KOM) of the Technical University of Darmstadt. The group covered a wide range of topics including content management systems content distribution networks, and different aspects of peer-to-peer systems. Andreas has a strong industrial background in asset & content management platforms, and an active International track record: He is on the Editorial Board of the ACM Multimedia Systems Journal; has participated in relevant standardisation activities including ISO and SMPTE; and is serving as expert advisor and evaluator for the European Commission (e.g. in the Networked Media Task Force).

B.2.2.4 C3

Since its foundation in 1996, C³ has focused its energies on fostering the integration of new technologies in the social and cultural tradition. In order that the new technologies be socially accepted, appropriated and largely employed, familiarity with models furnished by creative science as well as experimental avant-garde art and the creation of a novel, inspirational content are essential. C³ provides an ideal framework for all of this as a space for innovative experiments and initiatives, a site for free research and communication, active exchange of information, creative and educational work, and applied artistic imagination.

Within its activities aimed at the introduction and expansion of those scientific-technological innovations in Hungary, C³ – with the support of the Soros Foundation Hungary and MATÁV – provided several thousand NGO's and individuals with Internet access; organized free Internet courses; operated a public, free Internet "café"; and developed the web-based Freemail service, as well as the prototype of the public WebTerminal, its first copies of which were placed in public locations. See: C³ PROJECTS »»

Between 1996 and 1999 the Soros Foundation Hungary launched a Dial-Up E-mail and Internet Access Grant Program for civil service organizations. Webpages of the grantees (as well as e-mailboxes) – some one thousand non-profit organizations, several hundred school libraries, some one hundred schools participating in a self-development programme, 20 pedagogical institutes, 26 service points of the National Pedagogical Institute, community schools and municipal libraries – can be visited via the link collection of C³. While the grants expired at the end of 1999, the mailboxes and homepages created via C³ may remain on the C³ servers. C³ continues to provide connectivity for the various programmes of the Soros Foundation Hungary, as well as diverse self-financed users (e.g., the Central European University [CEU] and Open Society Institute [OSI]). The new autonomous C³ Foundation, as a member of the Council of Hungarian Internet Providers, launched an online domain registration and name server service in August 2000. C³ is an active creative force behind the introduction of new technologies, and an initiator of Hungarian and international projects launched with that aim (ATM, ADSL, streaming media, video on demand, etc.).

Artistic production, i.e., artistic works created at C³, occasionally exclusively by the C³ staff, as well as events organised, is a determinant element of C³, in its role as a new type of media center. The fruits of this artistic production are regularly invited for international presentation and exhibition, and further stimulate the initiation of new collaborative projects together with other partner institutions. They are preserved on the C³ website and may be located in the Collection, in the most suitable presentational form for web-based works.

Alongside the traditional library activity (printed publications, CD and video media library, art database), the C³ Archive also signifies net-based on-line publication: in 2000, C³'s endeavour to preserve and render accessible the significant harvest of Hungarian video art

was initiated, and this implies continuous serious work for some time to come. The archive treated up to this point may be explored on the web: http://www.c3.hu/collection/videomuveszet/indexen.html.

The organisation of public events proceeding from the character of C³ offer novelty to small groups and professional, specialised communities, while exhibitions and large-scale events are organised in suitable external locations, cooperatively organised with partner institutions. C³ continues its media theory and critical lecture series and workshop meetings, regularly holds its annual Open Day, and presents partner institutions operating in the region. In proceeding with its large-scale exhibition and event series, within the framework of a cooperative contract with the Mûcsarnok / Kunsthalle Budapest, C³ has realised the exhibition entitled Perspective in 1999 and Media Model in 2000, Vision in 2002, together with a rich accompanying events programme.

An important element of the operations of C³ is the preparation of publications, in the sense of both printed and electronic published materials. C³'s art journal was launched on the web in 2000 under the title Exindex (http://exindex.c3.hu/), in which up-to-the-minute information is provided on the Hungarian art scene, with a gallery listing, interviews, complete artists portfolios, and also guidelines and calls for Hungarian and international art-related grant opportunities. The renovation of the SCCA (Soros Center for Contemporary Arts – Budapest) database and its expansion to include an online version accessible via the Internet mean continuous work and maintenance (http://dokumentumtar.c3.hu/).

C3 has participated as partner in the following EU-projects:
GAMA: Gateway to Archives of Media Art – eContent (2007-2009)
Vivid [Radical] Memory - Culture 2000 (2006-2007)
TROIA - temporary residence of intelligent agents. Culture 2000 (2003-2006)
Light – Image – Illusion. Culture 2000 (2005)
SCALEX, IST-2001-35103
404 Object Not Found. Culture 2000 (2003)
CODE ZEBRA. Culture 2000 (2003)
Interfacing Realities - Master Classes. Culture 2000 (2002)
E:M:A:R:E European Media Artists in Residence Exchange. Kaleidoscope, (1995-1999)

Short profile of the staff members/key experts:

prof. **Miklós Peternák,** Dr. Habil, PhD. Born in 1956 Esztergom, Hungary, lives in Budapest. Studied history and history of art, PhD 1994: New Media - Art and Science. He was a member of the Béla-Balázs-Studio, Budapest (1981-87), worked at the Hungarian National Gallery (1981-83) and at the Research Institute for Art History at the Hungarian Academy of Sciences (1983-87). Head of the Intermedia Department at the Hungarian Academy of Fine Arts since 1990, director of C3: Center for Culture and Communication Foundation since 1997. He has produced several films and videos and published numerous articles and books on media art and media history, curated several exhibitions like The Butterfly-effect, 1996, Perspective, 1999, Vision, 2002, Active Image, 2005.

Mr**. Márton Fernezelyi**, Chief programmer, Project coordinator (marci@c3.hu)
Márton Fernezelyi studied informatics at the Technical University of Budapest, he is a programmer, system developer and teaches at the Intermedia Department of the Hungarian Academy of Fine Arts. He supervises art and technology projects at C3, he was one of the

developers of Freemail (http://freemail.hu/) and the WebTerminal (http://www.c3.hu/project/webterminal/index.html).

B.2.2.5 *MEDIA + SPACE*

MEDIA+SPACE is an atelier for media scenography and film production located in Berlin. It's specialized in media installations**: media+spaces** for theaters, exhibitions, museums, events, showrooms, trade fairs, art... One of the main characteristics of all the MEDIA+SPACE installations is the technical complexity they enclose, which is solved by a deep knowledge of the newest multimedia technologies.

MEDIA+SPACE plays a very relevant role in the ArcDecoMedia project, since they will provide their point of view as an end-user for the elaboration of the set of requirements of the ArcDecoMedia Environment. Furthermore MEDIA+SPACE will demonstrate the validity of the environment in the preparation of an artistic or commercial performance.

Marc Tamschick, Studies in graphic design at the academy of fine arts in Stuttgart, Dipl. film director of the academy of film Baden-Württemberg in Ludwigsburg (diplom 1994). 1994-2002 shareholder, founder and general manager of the MediaMutant
Filmproduction Gmbh & co. kg. producer, creative director and director of numerous music clips, commercials and media/film installations. Since 2002, Atelier Tamschick media scenography and film production in Berlin. Free media artist and director for scenographers, agencies, production companies and customers worldwide. Since 2007 shareholder, founder and general manager of Tamschick MEDIA+SPACE gmbh.

B.2.2.6 Fundació Privada Universitat i Tecnologia - Universitat Ramon Llull (URL)

Fundació Privada Universitat i Tecnologia (FUNITEC), is a non-profit making federated private entity constituted by the Spanish Law 12/1991 of 10th May and integrated by 10 centres each with their own juridical personality. Therefore, and taking into account that the project ArcDecoMedia would be executed by the URL's integrated centre Fundació Universitat i Tecnologia La Salle, with VAT number G-60643558 and according to the current norm, the justification of the expenses generated by the execution of this project will be indistinctly stated by both the VAT number of the University's central office (G-59069740) or that of the Fundació Universitat i Tecnologia La Salle (G-60643558).

La Salle School of Engineering and Architecture provides degrees of Electronics, Computer Science, Telecommunication, Image & audio, Multimedia and Architecture (3+2 years curriculum and PhDs). Dedicated to educating and training for over a hundred years, La Salle has created an extensive knowledge base as a result of its educational activities, research projects and activities in cooperation with the business world. La Salle Technology Transfer was set up over a decade ago with the aim of transferring to companies the knowledge generated at the university. This project is linked to the La Salle Business and Technological Innovation Park and enables the university to gain a clear, broad, first-hand overview of the business world. There have been more than 70 IT companies emerging from this Innovation Park so far.

Within the university, it is the TAM Research Group (Audiovisual & Multimedia Technologies Research Group) that will be involved in the ArcDecoMediaProject. The group has deep experience in the following areas:

- Virtual/Augmented Reality Interfaces.
- Multimedia communications (broadcasting and broadband networks, scalable video coding, interactive TV, ...).
- Immersive interfaces.
- Motion capture (24 camera motion capture facilities, cinematic identification of structures from sensor data).
- Photorealistic computer graphics.
- Virtual acoustics.
- Speech processing.
- Content management and adaptation (MPEG7 and MPEG21 based content management).
- User experience (usability lab facilities with CCTV and eyetracking).

Besides that, current TAM projects, such as a new approach to a Collaborative Virtual Environment (CVE), are absolutely related to the ArcDecoMediaProject paradigm. The CVE must be audio and visually realistic, adapted to different kinds of terminals and user capabilities, using multimodal interfaces able to communicate user emotion, and implementing different sorts of transmoding.

Ships, phones, planes, internet, and video conferences. Communications have globalized the planet. We can differentiate two types of communication, real or assisted. During real communication, people are physically co-located, and transport is necessary to attend the meetings (on foot, car, plane,...). During the assisted type it is not necessary to be there physically, co-located (phone, internet, video conferences...) Next years the broadband characteristics will change and will offer networks of gigabits per second that will co-exist with lower capacity networks and terminals such as mobile phones. The communication possibilities will increase. Moreover, we can imagine a new framework, in which virtual communication is a reality. This will enable people from different parts of the world to collaborate in a virtual setting, avoiding all the transport inconveniences, as well as the environmental impact. In such virtual environment people will see, hear and touch electronically what he/she would have seen, heard, and touched in the physical situation. This virtual communication will be available not only at home, but wherever we were and will require adaptation to the user needs and capacities.

The ArcDecoMediaProject will help developing new techniques for (semi-)automatically adapting user-to-user communication both in terms of (i) type of message (audiovisual, audio, visual or text) and (ii) output characteristics (terminal, bit-rate, etc.) for all kind of developments, like realistic CVEs. To that effect, multimodal interfaces and transmoding algorithms are to be implemented.

The group has successfully participated in several FP5 and FP6 projects (GMF4iTV, SUIT and porTiVity).

Short profile of the staff members/key experts:

Dr. David Miralles studied physics at Universitat de Barcelona (Spain) from where he received a theoretical physics degree in 1995. From 1996 to 2001 he was working at the Departament of Fundamental Physics at the same university. In 2001 he received a Ph.D. degree in Mathematical Physics. From 2001 to 2007 he was at Department of Communications and Signal Theory, Universitat Ramon Llull (Barcelona). He has stayed at Instituto de Matemática, Estatística e Computação Científica, Campinas, (Brasil, 1998), International Center of Theoretical Physics, Trieste, (Italy, September 2004), Observatoire de Paris (France, March 2005-06).

His research has been focused in mathematical tools from theoretical physics to engineering. He has published a group of ten journal papers in this area. Currently, he is working at Department of Audiovisual Technologies and his research is concentrated in multimedia mathematical developments.

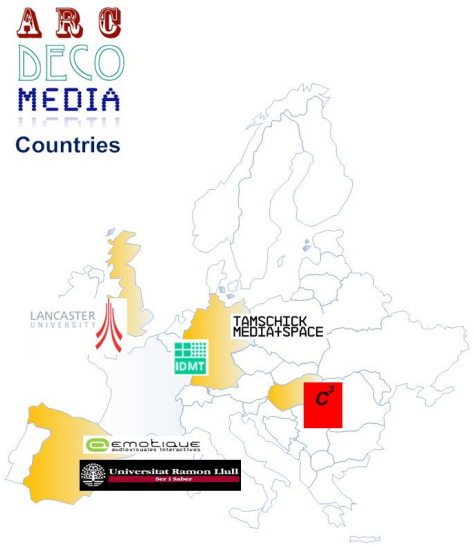
Dr. Oscar García Pañella holds a B.Sc. degree in Telecommunications, besides a M.Sc. and Ph. D degrees in Electronic Engineering, respectively, in 1995, 1998 and 2004, from La Salle School of Engineering in Ramon Llull University, Barcelona, Spain. His main Ph. D topic was an automatic simulation of deformable objects applied to Telemedicine, partially granted by the EPSON Ibérica's "Rosina Ribalta prize" for the best pre-doctoral project (1999).

He's enjoyed several stages abroad, like in the IMSC (Integrated Media Systems Center) of the University of Southern California (USC, Los Angeles, California, USA) or in the VIS Lab at The Henry Samueli School of Engineering (University of California at Irvine - UCI).

He leads the Multimedia Section within the Audiovisual Technologies and Multimedia Research Group (TAM) of the same university since 2002, while directing the studies related to Multimedia (an engineering degree in Multimedia and two master programs on the same topic (MCDM and MCDEM)).

B.2.3 Consortium as a whole

The ArcDecoMedia consortium is formed by **6 organisations** from **4 European countries**. The ArcDecoMedia architecture is conceptually conceived to create, integrate, deploy and control new Multimedia contents in response to the changing needs of the market. When building up the consortium it's been taken into account the presence of end-users in the sector but also research institutions and industrial companies, looking for complimentary skills of the partners to obtain a horizontal view of the system. It must be highlighted the presence in the consortium of **2 of the most reknown European research institutions** in Distributed Multimedia Systems: **Fraunhofer IDMT** and **Lancaster University**. Complementarity of each partner is described below:



- **Emotique** is a company that is self-defined as a R&D laboratory for the commercial sector. It not only does offer solutions to its commercial customers but also offers new revolutionary solutions to them. Emotique has a very good knowledge of the market (publicity, events, arts&technology) but is also deeply involved in R&D activities in the multimedia sector.

- **Fraunhofer Institute for Digital Media Technology IDMT** has developed some of the most relevants technologies worldwide for the development of the multimedia technologies. The project will take advantage of on of the main areas of experience of the institute, which are Multimedia Distribution and Security (both observed in specific work packages). This experience is mandatory to lead the project to a successful ending.

- Another important player of the project is the **Computing Department of Lancaster University,** which is involved in some of the most relevant R&D projects regarding Distributed Multimedia at a local and European scale. Their role in the project, researching on distribution technologies such as P2P, Unicast, Multicast or Hybrid is also mandatory to lead the project to a successful ending.

- **URL** as a R&D institution is an important player in the consortium owing to its knowledge in new emerging multimedia technologies. La Salle has a wide expertise in the user experience and multimedia communications, both of which will be observed in the project in specific work packages. Furthermore URL is an institution which is very close to ICT companies which is an asset for assuring the introduction of the ArcDecoMedia architecture in Spanish Multimedia Development companies.

- **C3** is also a very relevant player in the project since it's well known international platform for the exhibition of Digital Art and Dissemination of Media Culture. Thus its role as end-user of the environment is very important for the project. Furthermore, C3 provides the consortium with a wide experience in the development of interactive

multimedia systems as well as web 2.0 solutions in their media laboratory, one of the reasons why C3 will be responsible for the development of the collaborative network.

- **MEDIA+SPACE** is the work of Marc Tamschick, reknown digital artist that has created some of the most challenging interactive multimedia installations in Europe in the last few years. His knowledge is necessary to provide the set of requirements and specifications of the environment with a realistic view from an end-user, and also to validate the result of the project in a pilot action.

Subcontracting:

The tasks that cannot be performed by the partners will be subcontracted. The ArcDecoMedia Project proposes to subcontract three different issues:

1. Financial Auditing for all the partners
2. It's expected to subcontract personnel for the execution of some of the demonstrators: installers, artists, performers, etc will be needed
3. It's expected to subcontract specific technical services for the installation of leading-edge audio/video replay technologies that will be used for the demonstration actions.

B.2.4 Resources to be committed

To adequately perform the tasks described in B.1.3.2. Workplan description, the overall project budget will be **2.846.337**€ with a requested EC contribution of **2.095.949**€, with a total effort of **237** person-month.

	EMOTIQUE	Fraunhofer	Lancaster	URL	C3	MEDIA+SPACE
RTD (75%)						
Person-Months	**42,0**	**40,0**	**42,0**	**30,5**	**25,5**	**18,0**
Labour Cost	**277.200,00**	**197.446,80**	**315.000,00**	**156.566,67**	**56.100,00**	**211.200,00**
Travel & Subsist.	18.000,00	18.000,00	18.000,00	6.000,00	6.000,00	6.000,00
Materials	15.000,00	15.000,00	15.000,00	6.000,00	6.000,00	6.000,00
Equipment	18.000,00	18.000,00	18.000,00	0,00	0,00	0,00
Services	10.000,00	0,00	0,00	0,00	0,00	0,00
Overheads	166.320,00	242.859,56	189.000,00	93.940,00	33.660,00	126.720,00
Total Cost	**504.520,00**	**491.306,36**	**555.000,00**	**262.506,67**	**101.760,00**	**349.920,00**
Funding	**378.390,00**	**368.479,77**	**416.250,00**	**196.880,00**	**76.320,00**	**262.440,00**
Management (100%)						
Person-Months	**9,0**	**1,0**	**1,0**	**1,0**	**1,0**	**1,0**
Labour Cost	**59.400,00**	**4.936,17**	**7.500,00**	**5.133,33**	**2.200,00**	**11.733,33**
Travel & Subsist.	6.000,00	6.000,00	6.000,00	6.000,00	6.000,00	6.000,00
Materials	3.000,00	0,00	0,00	0,00	0,00	0,00
Equipment	0,00	0,00	0,00	0,00	0,00	0,00
Services	10.000,00	3.500,00	3.000,00	3.000,00	3.000,00	3.000,00
Overheads	35.640,00	6.071,49	4.500,00	3.080,00	1.320,00	7.040,00
Total Cost	**114.040,00**	**20.507,66**	**21.000,00**	**17.213,33**	**12.520,00**	**27.773,33**
Funding	**114.040,00**	**20.507,66**	**21.000,00**	**17.213,33**	**12.520,00**	**27.773,33**
Dem (50%)						
Person-Months	**3,0**	**10,0**	**2,0**	**1,5**	**1,5**	**7,0**
Labour Cost	19.800,00	49.361,70	15.000,00	7.700,00	3.300,00	82.133,33
Travel & Subsist.	6.000,00	6.000,00	6.000,00	0,00	1.500,00	6.000,00
Materials	3.000,00	0,00	0,00	0,00	3.000,00	3.000,00
Equipment	0,00	0,00	0,00	0,00	0,00	0,00
Services	10.000,00	0,00	0,00	0,00	3.000,00	6.000,00
Overheads	11.880,00	60.714,89	9.000,00	4.620,00	1.980,00	49.280,00
Total Cost	**50.680,00**	**116.076,59**	**30.000,00**	**12.320,00**	**12.780,00**	**146.413,33**
Funding	**25.340,00**	**58.038,30**	**15.000,00**	**6.160,00**	**6.390,00**	**73.206,67**
	EMOTIQUE	**Fraunhofer**	**Lancaster**	**URL**	**C3**	**MEDIA+SPACE**
TOTAL PM	**54,0**	**51,0**	**45,0**	**33,0**	**28,0**	**26,0**
TOTAL Budget	**669.240,00**	**627.890,61**	**606.000,00**	**292.040,00**	**127.060,00**	**524.106,67**
TOTAL Funding	**517.770,00**	**447.025,73**	**452.250,00**	**220.253,33**	**95.230,00**	**363.420,00**

TOTAL PM	**237,0**
TOTAL Budget	**2.846.337,3**
TOTAL Funding	**2.095.949,1**

B.2.5 Mobilisation and adequacy of resources

The ArcDecoMedia project partners plan to mobilise an amount of 237 person-months for the realisation of the overall project (see **Table 1.3d Summary of staff effort** in B1.3.2). The budget for personnel (direct labour cost and overheads) resources is with 94% the largest part of the budget. The overall budget distribution for ArcDecoMedia project partners is presented in Table 2.4-1.

Partner	Cost Model	Person Months	Personnel Costs € Incl OVHs	Non-Personnel Costs €	Overall Budget €	Requested EC Contribution €
EMOTIQUE	FR	54	570.240,00	99.000	669.240,00	517.770,00
FRAUNHOFER	RC	51	561.390,61	66.500	627.890,61	447.025,73
LANCASTER	FR	45	540.000,00	66.000	606.000,00	452.250,00
URL	FR	33	271.040,00	18.000	292.040,00	220.253,33
C3	FR	28	98.560,00	28.500	127.060,00	95.230,00
MEDIA+SPACE	FR	26	488.106,67	36.000	437.013,33	363.420,00
	Total:	**237**	**2.529.337,28**	**314.000**	**2.846.337,28**	**2.095.949**

Table 2.4-1 Summary budget distribution

The personnel costs column of Table above includes overheads. The non-personnel costs as presented are planned for travels, consumables and services, including audits. Table 2.4-2 summarises the estimated global main budgets of these costs categories.

Cost Category	Overall Budget €
Travel & Subsistence	133.500
Consumables (Materials and Equipment)	129.000
Subcontracting (incl. Audits)	51.500
Total:	**314.000**

Table 2.4-2 Costs for consumables, travels and subcontracting

The costs for travels are planned for all project related travels (including travels to be done in Management, RTD or Demonstration activities). Although travel & subsistence costs are apparently high, this is because the type of research work to be performed requires the presence of technical at the RTDs and industrial partners and stays will be for long periods. Herewith a list of the estimated types of travels are enclosed:

- for the demonstration activities: set up of the installation, execution and monitoring
- for meetings of the project management boards, i.e. SC every six months; Plenary Board once per year, WP teams phone conferences and meetings on demand;
- for technical working meetings of the project partners, which will be held, at least 1 every two months;
- for dissemination at international conferences;
- other dissemination events (i.e. seminars, workshops in the regions);
- for technical and management reviews (i.e. also including reviews by the EC, at least 2 travels per partner;
- And other necessary meetings during project performance in order to achieve successfully ArcDecoMedia objectives.

Moreover, the partners will carefully plan and harmonise necessary travels, especially to consider possibilities to timely combine meetings of different nature at one place as far as feasible.
The costs for consumables for realisation of dissemination and exploitation activities (such as installation of project web-page, mailings, realisation of workshops, printing costs for the project leaflet) are also planned and are presented in Table 2.4-2

Activity	Budget €	%
RTD	2.265.013,03	80
Management	210.054,33	7
Demonstration	368.269,92	13
Total ArcDecoMedia Budget	**2.846.337,28**	

Table 2.4-3 ArcDecoMedia Type of Activity

The **Budget is also planned and distributed according to the types of activities**. The ArcDecoMedia project partners are planning **80% of its budget for RTD activities.** This RTD budget includes budget for materials and services. **7 % of overall budget is planned for consortium management activities,** including the costs for the preparation of audit certificates.

Overall budget for management is limited (according to EC rules) to be bellow 7%. Notwithstanding this, all ArcDecoMedia partners have agreed to allocate into management cost category labour resources necessary to compromise and assure high quality of the periodic reports, technical deliverables and participation in management activities. Specific resources dedicated to Technical management have been allocated as RTD cost category (not funded 100%).

Due to the specific nature of the project, **13% of the budget is allocated to demonstration activities,** including minor budget for services and material for the demonstration.

The realisation of the ambitious business and technological objectives incorporates several risks as described in section B1.3.3. Therefore, the ArcDecoMedia consortium has carefully planned the distribution of efforts to the different work packages over the project life-cycle. As such, the workplan and particularly the first half of the project duration, has been set up in accordance to the potential risks, enabling to refine the technical direction of the project and also providing sufficient resources to the second half of the project, if a major redistribution of efforts have to take place (i.e. further detailed contingency plans are elaborated along the project life-cycle, based on the DoW and the continuous risk assessment).

Sub-contracting
The subcontracting in the project has been planned for:

- audits, included in Management costs,
- design of project web site
- Communication brochures.
- services for demonstration activities: renting of material, performers, etc.

It must be remarked that an important part of the budget is dedicated to Equipment, since development and demonstration will need of state-of-the-art hardware in order to properly validate the results of the project.

B.3 Impact

B.3.1 Expected impacts listed in the work programme

Objective ICT-2009.1.5 , Networked Media and 3D Internet claims for ***"Content aware networks and network aware applications"*** that's to say *"Architectures and technologies for converged and scalable networking and delivery of multimedia content and services dynamically optimised with policies taking into account the content and adaptation needs, the user contexts, requirements and social relational network for a variety of contents, services that may include home management, applications, locations and mobility scenarios. They enable multiple user roles as content producer, user or manager".*

In this sense the ArcDecoMedia architecture will allow not only creating new contents integrated in different technologies but also deploying and controlling them remotely. These contents may be interactive by means of devices or the human body, may be immersive or traditional in different installations (user contexts), and will even open new ways of experimentation by the integration of legacy content types, scientific contents, etc. It will even let remotely change and control contents so the final multimedia product may be updated on the end user's demand (content and adaptation needs). Nowadays developing such type of products means several thousands of code lines and requires expert staff. Furthermore there're no cost efficient solutions nowadays allowing such implementation.

Information systems are getting more and more multimedia-based as well as network-based. Clear examples of this trend are various Internet applications for areas such as: business, education and entertainment. This evolution together with the generally increasing change rate in organisations and society pose new demands on methodologies and competencies required for developing future multimedia information systems.

> *"The Information Society brings benefits to European business, society and culture only because it delivers useful content and services, where and when you want them. Digital content and services are therefore crucial to delivering the Information Society's benefits to Europe's society and economy ... and also represent a potentially major source of new jobs and growth." (Fuel for the Information Society. http://ec.europa.eu/information_society/industry/content/index_en.htm)*

ArcDecoMedia proposal involves a multidisciplinary effort requiring cooperation of people from different backgrounds required for developing future multimedia contents and its delivery and exploitation by means of the Internet, with their own specific competencies, methodologies and views of the world. By this ArcDecoMedia will clearly target the already identified demands from the community of creators and specialists in multimedia content development and distribution. Primary beneficiaries of project results will be the participants in the value chain of content generation, extraction, development and distribution/sharing. This sector is steadily and fast growing, being presently one of the most promising IT related sectors (it can be estimated that EU employs more that 2 Million high skilled technicians in this specific sector). The sector itself is composed by a huge number of heterogeneous teams ranging from Artistic Creators, IT and multimedia specialists (software, audio, video, Internet specialists), producers and distributors.

The objective also underlines the necessity of integration of distribute contents by means of a social relational network for a variety of contents. One of the objectives of the proposal is defining the best strategies for sharing information among the community of creators and developing the platform that will allow content sharing. Content to be shared may be in legacy or actual formats and even should be prepared to store contents of future formats. This key issue of the environment will allow users, experts or not, to discriminate contents out of the diversity of information and content on the web.

As described in the work proposed, ArcDecoMedia will let integrate and combine different types of contents in several kinds of devices and even broadcast them to several places in the world. The ArcDecoMedia project will be a highly modular environment with a loosely-coupled architecture and will include a visual programming language any type of user (even novel ones) will easily identify. This means that usability, accessibility, scalability and cost-effectiveness will be assured in the ArcDecoMedia Platform which is an interesting competitive factor before the existing environments in the market.

This fact is in line with the challenges defined by the European Commission for leading the way to the Internet of the Future. This concept deals with the real needs of the Internet nowadays, an Internet that has not been designed to permit the types of transactions and volume of traffic that takes place nowadays. In this sense European Commission encourages the creation of new Architectures and Software Engineering approaches as *a basis of tomorrows networked and collaborative platforms in the residential and professional domains.*

B.3.2 Socio-economic impact

Using the project results to optimise creation, production and distribution of multimedia content will enable creators and producers to improve quality and productivity of their processes by better utilising installations (very expensive hardware infrastructure) and providing better services to their customers, thereby improving their **competitiveness and business development** thus safeguarding and increasing the employment in the sector.

> *"... useful content and intelligent services make our lives easier, richer and safer. They also represent a huge new global market in which practically any innovative company or even individual can make their mark. Digital content and service providers already - directly or indirectly - employ millions of people all over Europe. With Europe's rich cultural heritage serving as raw material, much more growth is possible.". (Fuel for the Information Society. http://ec.europa.eu/information_society/industry/content/index_en.htm).*

On the other hand, content vendors will be able to offer optimised products and services to their customers. This will have a direct positive benefit for **employment**, as the companies can use the improved competitive position to build up further business. Provision of the new services which will support reuse of previous contents will make **employment of people easier** (services will be specifically important for newcomers). The project results will have a strong impact on **training & education of personnel**, in the very sector of multimedia content creation and distribution enhancing IT skills of creators and technicians involved in the whole process thus increasing the competence of EU employees in this sector.

On the end user side, multimedia systems that integrate ArcDecoMedia will help developing are related to interactive installations for **in-store marketing, merchandising for retailers and manufacturers.** These actors have shown an increasing interest in such applications during the past 10 years, thanks to the increased competition between retailers and channels and the loss of faith in traditional marketing. In this sense ArcDecoMedia will provide creators with a powerful tool capable of communicating, strategizing, visualizing and planning such solutions **anywhere, anytime**. Content and installation designers for shopping malls, leisure parks and even small shops are the main target customers of the ArcDecoMedia technology.

In October 2002, Willard Bishop Consulting noted: "Consumers make 70% of all purchase decisions while in the store shopping …That is the Number One Reason why the store is the new platform for brand marketing". Big shopping malls and leisure parks around the globe are two big target consumers of the type of contents that may be managed by means of the ArcDecoMedia architecture.

Other already identified customer targets are **museums** (mainly modern art museums) and artistic performances. Proliferation of festivals, medialabs, dedicated spaces and performances world-wide during the last ten years manifest the convergence of art, technology and entertainment is a fact nowadays. Some relevant event producers or dedicated spaces are:

Ars Electronica (Austria), **BlastHaus** (San Francisco, USA)**, Le Laboratoire** (France), **C3** (Hungary), **Vida X.0** (by Fundación Telefónica, Spain), **ArtsLab** (New Mexico, USA), **Digital Art Museum** (Berlin, Germany), **STRP Festival** (Netherlands), **Rhizome.org & New Museum** (New York, USA), etc

Here creators (digital video-artists, conceptual artists, etc) and even producers of events are potential users of the ArcDecoMedia architecture.

On the citizens side, ArcDecoMedia will facilitate creation of content for **leisure applications** (e.g. video games with new interactive gaming experiences) and paves the way to what could be the future **home applications** (e.g. domotic based applications, also stated in the workprogramme "*services that may include home management, applications, locations and mobility scenarios"*) enabling non expert users to acquire, manage and share content in different media.

As stated in the proposal a special emphasize will be made in the **arts & technology arena**. The European Commission has announced that it would like to make **2009 the European Year of Creativity and Innovation**. Because of the importance of the cultural sector to the economy, artistic creativity and flair will also be promoted in 2009, as a follow-up to the **European Year of Intercultural Dialogue (2008)**.

According to **Ján Figel**, Commissioner responsible for education, training, culture and youth, this Year will be *"an effective way of helping to meet challenges by raising public awareness, disseminating information about good practices, stimulating education and research, creativity and innovation, and promoting policy debate and change. By combining action at Community, national, regional and local levels, it can generate synergies and help to focus policy debate on specific issues".*

B.3.3 Dissemination, results exploitation, and management of intellectual property

B.3.3.1 Dissemination activities

The ArcDecoMedia dissemination strategy consists of several coordinated activities aiming at both communicating the project achievements and lessons learnt, and receiving feedback from project constituency to revise or refine the approach, thus enhancing its applicability. The planning of dissemination activities, which is a horizontal procedure along the overall project lifecycle, will start as soon as the project begins. The ArcDecoMedia dissemination strategy will make use of three major dissemination channels and their corresponding dissemination activities. Each dissemination effort will be designed as blend of dissemination channels from one or more channels, adapted to the specific needs of the respective target group(s) that it aims to address.

The three channels and their component activities (in bold) are:

- **Online and Electronic Dissemination**

A website will provide a **first point of access for all the scientific and business parties** interested in the ArcDecoMedia project. Key results of the project will be published on that website. Moreover, other added-value services will be offered, such as, newsletters, mailing lists and communication with project researchers. The long-term objective of the online dissemination policies is to **create a community of interested parties** centred on the project, accelerating their **involvement and creating awareness** of the research results.

- **Non-Electronic Dissemination**

Conventional vehicles of knowledge transfer, such as **articles** in topic-specific journals, brochures and company newsletters, **publications in broadcast media, research papers and monographs** will focus on the dissemination of the project results of primary interest to experts and professionals. The non-electronic dissemination process is expected to increase the level of information need, promote involvement and **invite interactive participation of interested parties**, therefore, careful design of related dissemination policies is essential. Such activities will guarantee a high degree of knowledge promotion within all targeted groups (including "non-digital literate enterprise professionals").

- **Interactive Dissemination**

This channel provides an opportunity for **personal interaction in academic, commercial and business-economic conferences,** EU-organized events, conferences, trade fairs or art exhibitions. The interactive channel of dissemination will target groups with a high level of information need and involvement. Accordingly, it will provide **information tailored to highly-specialized audiences**. The interactive channel will provide the **most efficient** means of community building and yield the greatest impact on dissemination and exploitation.

A multi-step and multi-channel dissemination strategy will be followed in order to reach different target groups, requiring the careful tailoring of the information to the audience level of need /

involvement. Those ArcDecoMedia members which are technology providers and commercial service providers will approach relevant industry sectors, and potential markets and customers. The research institutes and universities will focus on researchers and professionals from both academia and industry. The table below shows the dissemination roles that ArcDecoMedia participants will undertake according to target audience.

Events relevant to ArcDecoMedia topics, where the consortium representatives may present and disseminate ArcDecoMedia results, include European and global level e-Challenges, the European Conference on Information Systems (ECIS), IEEE ICCGI, IEEE CEC/EEE, as well as a range of national events (e.g. CEBIT Hanover, SIMO Madrid), International Conferences and Exhibitions of Arts & Technology (FACT United Kingdom, Ars Electronica Austria, C3 Hungary, Technarte Spain, etc).

Additionally, the ArcDecoMedia project will seek information exchange with other related European research activities, particularly those addressing the work programme of the ICT Objective Intelligent Content & Semantics. The ArcDecomedia consortium will establish links with current research projects and ICT related Technology Platforms aiming at bi-directional knowledge transfer.

Targets for focused dissemination activities include:

Means of Dissem. Goal: Best possible take-up potential		Target Audience and Dissemination Activities		
		Interested Community	**Activities**	**Followers**
Disseminators	**Research Institutes & Universities**	Academic community: - Authoring Environments - Multimedia Storage, Synchro and Communication - Semantic Multimedia - Human-Machine Interaction Related EU projects IST community General audience Students	Scientific papers Journal articles Presentations Workshops WWW Newsletters, mail lists Lectures Scientific, Socio-Economic and EU conferences Community Building	Postgraduate or "postdoc" work Education Subsequent research projects
	Technology Providers & Integrators	Standartization bodies InnovationTransfer Organisations Business Process Management suites and services providers	Brochures Pilot Cases Demos Trade fairs and exhibitions WWW Community Building	Integrators New Ventures Public Entities & Policy Makers Business Collaborations
	Users /Customers	SME representatives Big Industrial representatives Representatives of different Industry-sectors Art&Technology Producers General audience	"On-site" presentations Pilot case Demos Brochures WWW CD-ROM Videotapes	-

In addition to the above, every effort will be made to strengthen the ICT programme in general and the project's visibility by participating in relevant programme activities. Programme administrators and other relevant ICT projects will be invited to focused workshops, presentations and performances for relevant constituencies. At the national level, each partner will make related information available to national SMEs and industrial sectors' associations, and contacts made during the course of its activities.

B.3.3.2 Exploitation of project results

The ArcDecoMedia staged approach

All dissemination and exploitation efforts and materials, as well as their viability, integrity, complementarity and consistency, will be supervised in WP9. ArcDecoMedia follows a stepwise approach to ensure maximal exploitation of the project results:

- **Step 1**: Investigation of all relevant market industries and application sectors including current practices and needs, regulatory and policy recommendations, which underline the need for ArcDecoMedia Environment, taking into account related marketing and socio-economic research studies, and carrying out complementary primary research where required.
- **Step 2**: Analysis of complementary and competitor services available in the market. Identification of emerging best practices across the Authoring for Complex Multimedia Systems domain internationally, as well as identification of current restrictions and problematic infrastructures.
- **Step 3:** Development of commercialisation & deployment scenarios, market and business models for individual and for joint exploitation, specification of collaboration roles, costs and revenue flows, thus enabling the calculation of net return over time for each type of market player, commercial or public.
- **Step 4:** Development and Validation of proof-of-concept applications in the target areas of the project (multimedia R&D, arts&technology, industry), relevant business assessment and cost/benefit analysis.
- **Step 5**: Organisation, planning and execution of wide impact dissemination activities to communicate the ArcDecoMedia activities and approach to the citizen, academic community, the IST and general RTD community, among public authorities, user associations, care provider organisations, and all other peers.
- **Step 6:** Regular review, revision and refinement of partner-specific exploitation plans and joint/collaborative business plans in the light of interim project results. Formalisation of service level and other appropriate agreements for joint exploitation among partners and third parties including possible creation of new legal entities (joint venture).

B.3.3.3 Overall exploitation plan

Product focus:

The ArcDecoMedia project will be developed putting the main focus on the multimedia market, but keeping in mind the big potential for industrial sectors thanks to the open nature of the Environment. Project developments along the aforementioned focus areas provide an excellent product framework directly marketable and easily commercialisable, since ArcDecoMedia will result in the development of:

- **Environment** that will be domain-, platform- and device-independent, thus enabling its application and use by different industrial sectors.
- A set of **business adoption and validation methodologies**, which will enable any industrial sector to comply with underlying business changes and seamlessly integrate emerging technology, supporting its continuous evolution.

- Various **demonstrations** in the Commercial, R&D and Arts sectors that will be supported by a set of validated metrics and an extensive cost/benefit analysis, that will ultimately introduce the concepts created within the project.
- An exploitation plan of applying the framework to other industrial sectors, a thorough **impact assessment**, and an extensive analysis and specification of the legal, regulatory, economic, etc. issues that will foster the expected market breakthrough.

More specifically, all partners will benefit from the ArcDecoMedia project by

The overall exploitation plan revolves around three axes:

- The **knowledge** that will be acquired throughout the different phases of the project and will involve the required theoretical and practical background for building the next generation of authoring environments for complex interactive multimedia applications, and effectively evaluating the impact of these applications in the three different arenas proposed in the project, through the adoption of appropriate utilization metrics. This knowledge will enable research partners to **support innovative work** with real-world application scenarios, and the industry partners to serve as **consultants** to the EU enterprises that wish to integrate their legacy systems.

- A set of **tools and technologies** that will be developed and will comprise the ArcDecoMedia Environment. These tools will enable creators in the Multimedia industry to become "networked", sharing contents and easily integrating novel and legacy technologies in their applications. The partners will be able to install, customize and further support their deployment, integration, and operation within EU enterprises, enabling them to gain a **strategic advantage** over their intra-industry competitors in terms of cost reduction and differentiation of services. Since the ArcDecoMedia approach is open, modular, flexible and scalable, these tools and technologies will **be easily adopted** by any big industry or SME that wishes to integrate different formats (flash, …) and devices (beamers, light systems, etc).

The project implementation and exploitation will be further supported by the participation of the end users in an iterative and incremental prototyping process where the expected results will be designed and reengineered taking into account their input, intensely evaluated even after project ends.

Based on this exploitation approach, ArcDecoMedia partners will be able to establish themselves **as major players in their area of expertise**. The research partners will be able to disseminate and exploit the project's ideas in a scientific level. The industrial partners will be able to address the needs of their existing clients, as well as increase their market share by addressing new clients as well. The end users will be able to exploit the implemented platform.

B.3.3.4 Individual exploitation plans

Table 2.3.2 Short description of the consortium and intended exploitation routes

No	Partner	Ctry	Competence	Role	Interest in the project / Exploitation route
1	EMO	**SP**	Emotique is a technology-based new company committed to the creation of multimedia services and contents for marketing and leisure sectors, with own creative and productive processes, emphasizing technical innovation in all the services they provide.	**CO**	* **Reference markets:** big commercial brands, museums and art performers. Reference clients reside approximately 60% in Spain, 10% in rest of Europe and 30% America. * **Business models:** license agreements with ArcDecoMedia technology integrators, offer of product and services to end-users.
2	FhD	**DE**	Applied research, development and standardization in the area of digital media technologies, in particular: authoring environments, interactive A/V applications, immersive multimedia systems, metadata formats, content-based a/v analysis and semantic annotation, a/v search and recommendation, media distribution, authentication and security, DRM alternatives, privacy.	**CR**	* **Reference markets:** new media technologies for the professional markets and for the home entertainment sector (B2B and B2C), growing global markets, reference clients reside approximately 50% in Germany, 25% in rest of Europe, 25% US and Asia * **Business models:** Technology marketing of patents and software components directly or through key integration partners, R+D contracts and license agreement with revenue shares for technology exploitation, granted rights are usually non-exclusive, Fraunhofer usually doesn't offer end-consumer products or services directly.
3	LAN	**UK**	Applied research, Education and training. Technology Transfer, transferring to companies the knowledge generated at the university. Creation of Spin-offs.	**CR**	* **Reference markets:** security and new media technologies for the professional markets, reference clients reside approximately 85% in United Kingdom, 15% in rest of Europe and US. * **Business models:** Strategic partnership with companies and other bodies, Consultancy and graduate placement, Licensing and Spinouts of research results, Knowledge transfer programmes.
4	URL	**SP**	Education and training. Technology Transfer, transferring to companies the knowledge generated at the university	**CR**	* **Reference markets:** multimedia companies settled in Spain, mainly in the area of Barcelona. * **Business models:** license agreement with ArcDecoMedia technology integrators, offer of services to end-users.
5	C3	**HU**	Space for innovative experiments and initiatives, a site for free research and communication, active exchange of information, creative and educational work, and applied artistic imagination.	**CR**	* **Reference markets:** art & technology performers locally and world-wide. * **Business models:** To provide local and international creators with leading-edge technology for their creations. Obtain international presence in the art&technology scene.
6	MEDIA+	**DE**	Atelier for media scenography and film production	**CR**	* **Reference markets:** big commercial brands, museums, theaters and art performers. Reference clients reside in Germany and worldwide in equal terms. * **Business models:** offer of final product to multimedia consumers. MEDIA+SPACE expects to obtain special advantages from the technology to be developed under the project so they can offer a wider and more revolutionary range of choices to their customers.

B.3.3.5 Management of knowledge and intellectual property

For every partner of the ArcDecoMedia consortium, it is very important to have explicit rules on how to manage pre-existing know-how and foreground knowledge, and in particular how to ensure the protection of intellectual property. Therefore, ArcDecoMedia partners have drafted a Consortium Agreement, including IPR Issues, to support common and individual dissemination and exploitation strategies. A ArcDecoMedia Exploitation Agreement will be developed taking into account the following preliminary agreements:

- Concerning exploitation of the project results, it is the understanding of the ArcDecoMedia Consortium that *knowledge and pre-existing know-how* will be made *available to the Consortium members under favourable conditions* if they are *necessary to perform the research and related work in this project*. The placement of pre-existing know-how into the project will be detailed in the Appendix of the Consortium Agreement. Therein, every single partner is entitled to describe its own pre-existing know-how.
- *Foreground knowledge is owned by the contractor generating such information or result*. Each contractor shall make *available* its foreground knowledge, on a royalty-free basis, to other contractors to the extent that such information is *necessary for the production of their own foreground knowledge within* ArcDecoMedia. If it is not possible to determine exactly the ownership of that foreground knowledge, e.g. several contractors participated in that specific development, ownership will be shared (pro-rata) according to effort invested by each contractor.
- *Pre-existing know-how and foreground knowledge* will be made *available*, on a royalty-free basis, *to the other project partners for dissemination, research and academic purposes* with respect to the intellectual property rights of the partner generating this knowledge.
- *Pre-existing know-how and foreground knowledge* will be made *available to the other project partners for exploitation purposes at favourable conditions*, with respect to the normal commercial conditions applied by the granting partner.

The Project Coordination Team, after collaborating with the Innovation Manager, will develop the agreement on IPR issues to be included in the Consortium Agreement. This agreement will regulate obligations and rights of the participants, and will be prepared and signed by the partners no later than the contractual project start date. The Consortium Agreement makes explicit reference to important administrative points such as decision procedures within the project, risk management strategies, legal aspects regarding software to be used/produced in the project, trademarks, patents and rights of each partner in the exploitation of results. The Consortium Agreement specifies administrative processes, defines access rights to Pre-Existing Know-How, knowledge, dissemination rules, and IPR. Legal documents such as the Consortium Agreement as well as use and exploitation plans

are envisaged to minimize potential conflict within the consortium and thus will be adapted to the typical requirements of the consortium members of ArcDecoMedia.

B.4 Ethical Issues

ArcDecoMedia proposal does not imply any major ethical issue that needs to be specifically considered. With regard to data protection, all organisations involved will treat any information concerning third organisations and people as restricted (e.g. as a result of dissemination events or participants to clustering activities or workshops).

Participation in ArcDecoMedia project implies commitment from all participants to:

- Avoid any unnecessary collection of personal data.
- Store all personal data into secure databases
- Only use such data for the purpose of the project.

An informed consent will be requested prior to including any information from third organisations into dissemination databases, and these data will only be used for the accepted purposes.

ETHICAL ISSUES TABLE	YES	Page
Informed Consent		
• Does the proposal involve children?		
• Does the proposal involve patients or persons not able to give consent?		
• Does the proposal involve adult healthy volunteers?		
• Does the proposal involve Human Genetic Material?		
• Does the proposal involve Human biological samples?		
• Does the proposal involve Human data collection?		
Research on Human embryo/foetus		
• Does the proposal involve Human Embryos?		
• Does the proposal involve Human Foetal Tissue / Cells?		
• Does the proposal involve Human Embryonic Stem Cells?		
Privacy		
• Does the proposal involve processing of genetic information or personal data (eg. health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction)		
• Does the proposal involve tracking the location or observation of people		
Research on Animals		
• Does the proposal involve research on animals?		
• Are those animals transgenic small laboratory animals?		
• Are those animals transgenic farm animals?		
• Are those animals cloned farm animals?		
• Are those animals non-human primates?		
Research Involving Developing Countries		
• Use of local resources (genetic, animal, plant etc)		
• Benefit to local community (capacity building i.e. access to healthcare, education etc)		
Dual Use		
• Research having direct military application		
• Research having the potential for terrorist abuse		
ICT Implants		
• Does the proposal involve clinical trials of ICT implants?		
I CONFIRM THAT NONE OF THE ABOVE ISSUES APPLY TO MY PROPOSAL	**X**	

B.5 Consideration of gender aspects

More and more women are taking part in most areas of economic, social and political life, and their role in those spheres is developing. Nevertheless, they remain particularly under-represented in scientific research and technological development. In most European countries, the proportion of graduate women below 30 years of age has overtaken that of men. In European research, however, women are still underrepresented, especially in senior positions. (Helsinki-group report - Women and Science homepage) In the public sector - universities and research institutes - the proportion of female researchers varies between one quarter and one third; at the top level of full professorships it less than 12 per cent.

In industrial research and innovation the situation seems to be even worse. Studies about gender differences in scientific subjects or in computer related subjects show that although there are obvious innate differences between men and women and their specific abilities, the societies are responsible of formulating gender roles and incorporating these mental differences into social structure. In this way, the male attitude to math and science that data gives, has became a social role as if there would be an inability of women to access to science word.

"Women should have an equal right to enjoy the advantages that a scientific career can offer and to be involved in decision making on research priorities. Indeed, their contribution is vital to the future development of science in Europe […] we need the best human resources at our disposal, both those of women and men." Definitely, in our Countries there's a "technological gender gap" to be bridged. Helsinki group work has highlighted that women in the technical field fall down in "leaky pipeline" phenomenon: women begin scientific careers, sometimes they are the majority in graduating in some discipline, but they disappear in disproportionate numbers at each stage of the academic steps. ***ArcDecoMedia*** will actively work to bring women and men into all consortium activities with equal opportunities, but giving special emphasis to having an **active role of women in the decision making process**. In addition to this, ArcDecoMedia will actively promote the participation of women **in all phases of the project** starting from the analysis parts and the collection of requirements, following with the scientific development of appropriate solutions (platforms and / or tools), and finally in the evaluation and validation phases.

The project is committed to emphasise the role of women are also presented in their role as researchers in order to trigger their interest in both the project and science related activities. A major role in this connection is played by the use of language and concepts that can determine the direction of scientific practice, the questions that are being asked, the results obtained and, therefore, the interpretations of the results. The use of language and concepts can constitute and create gender bias by simply failing to take into account gender or other

differences. All documents will be written in a manner that does not show a preconception of gender roles.

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B.7 Abbreviations

C	Confidential
CO	Coordinator
D	Deliverable
e.g.	*exempli gratia* = for example
EC	European Commission
etc.	*et cetera*
i.e.	*id est* = that is to say
ICT	Information and Communications Technologies
M	Month
mlstn	Milestone
P	Public
p-m	Person-month
Prot	Prototype
R	Report (in Nature), Restricted (in Diss. Level)
RTD	Research and Technological Development
S&T	Scientific & Technological
SME	Small and Medium Enterprise
SoA	Service Oriented Architecture
STREP	Small or medium-scale focused research project
Sw	Software
WP	Workpackage