eMotional

Advanced Authoring Environment for the Creation, Deployment and Control of Professional Complex Interactive and Context Aware Multimedia Systems

Type of funding scheme	Small or medium scale focused research project (STREP)
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List of participants

1	**Emotique**	**EMO**	**Spain**
2	**Fraunhofer IDMT**	**FHF**	**Germany**
3	**C3**	**C3**	**Hungary**
4	**DERI**	**DER**	**Ireland**
5	**MEDIA+SPACE**	**MED**	**Germany**
6	**Universitat Ramón Llull Fundació Privada**	**URL**	**Spain**
7	**PLANOMAR**	**PLA**	**Finland**
8	**Le Laboratoire**	**LELAB**	**France**

Co-ordinator name:	Mr. Aitor Elorriaga
Co-ordinator organisation name:	Emotique
Co-ordinator email:	aitor@emotique.com

PART B - Table of Contents

Proposal Abstract:

eMotional proposes the creation of an advanced concept of authoring environment that will solve the new challenges the increasing overload of information and content will provoke in multimedia products of the future.

eMotional will develop and integrate a set of tools for creators to **intuitively build, deploy and control** complex professional multimedia systems incorporating more **participative and communicative forms of content**. Furthermore it will not only allow creators to capture, create and manage content in an effective and intelligent manner but also will permit **users to share and reuse huge amounts of information** among the community of creators, enabling new ways of experimentation.

eMotional provide the right answer to a number of S&T challenges:

- Exploring limits of **visual programming languages** for enabling non-expert users to easily program complex interactive multimedia systems, allowing experimentation in new ways of story-telling.
- 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.
- Finding the best **strategies for Multimedia Systems Communication & Synchronization, Storage & Retrieval** that will support the Multimedia systems of the future, allowing creators to share and combine materials guaranteeing their intellectual property rights.

As a result eMotional will make 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 taking into account the move in content consumption **from few-to-many to many-to-many models**.

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

B.1.1 Concept & Objectives of the eMotional Environment

B.1.1.1 The eMotional Concept

The eMotional project proposes the creation of a new concept of authoring environment that will give solution to the new challenges the multimedia products of the future will have to overcome. These challenges are, mainly, availability of contents any time, any where and customization of contents.

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. There're specific solutions for specific types of customers: museums, tv channels, etc that evolve their features on demand of the customers.

The objective of the eMotional project is not only supplying technical support 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.

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 multidisciplinar research where industry, creators and research community .

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 eMotional consortium will develop a set of tools to be integrated in an Environment that will let creators build complex professional interactive and context aware multimedia systems. These tools are:

1. **Tools for the creation, integration and development** of new multimedia functionalities (e.g. integration of 3D engines, artificial vision libraries, commercial authoring systems such as Flash, etc).

2. **Tools for integration of the previous developments in distributed multimedia systems:** the platform will allow graphically creating, configuring, deploying and controlling sets of installations (e.g. a group of video installations in a museum).

3. **Tools for deploying the previous development at a world-wide level**: the platform will allow to graphically create different topologies of multimedia systems that may be world-wide distributed and configure, deploy and control them (e.g: connecting DBMSs, Server Systems and installations of a network of European Museums).

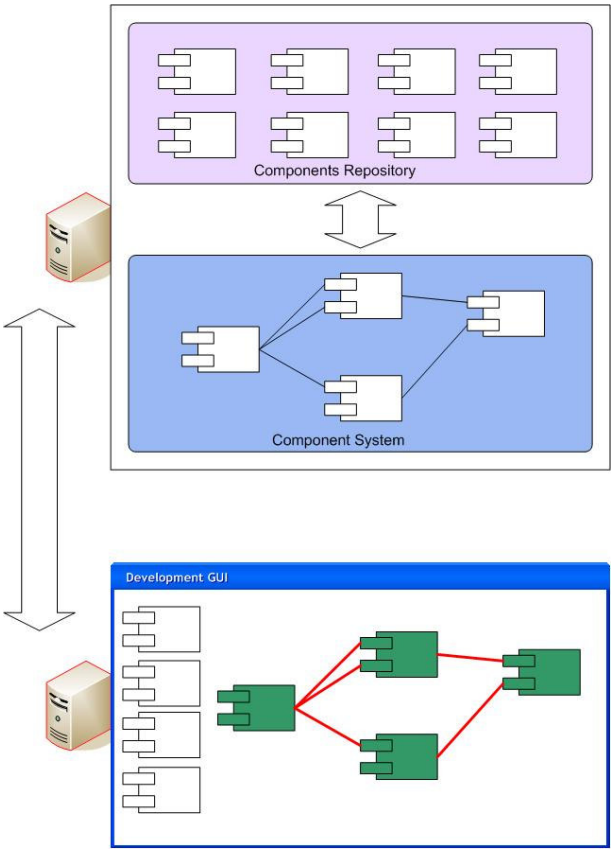
4. **Mechanisms to transform simple multimedia systems into context aware systems** able to provide customized contents to the user.

5. **Collaborative tools 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).

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

- Will enable the creation of multimedia solutions for the newest technologies
- 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.

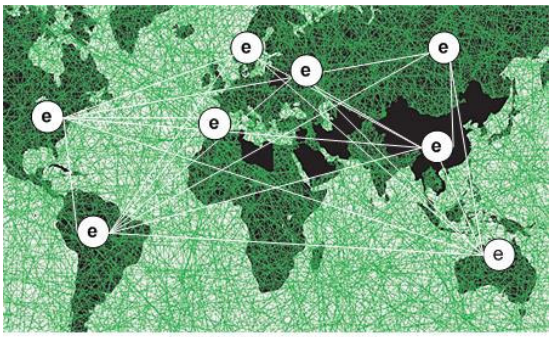
What are the characteristics a platform of this type must have to become the solution the sector requires?



1. **A new authoring concept that enables easy integration of new Technologies.** The authoring approach the eMotional project proposes will be based on an open, modular, visual paradigm that will allow the user to easily create multimedia contents integrated into the most complex technologies. The following paradigms of open, modular and visual systems have been chosen to feed the programming language in the eMotional Environment:

   - **The Lego ® System:** a modular system that allows the user to create complex products from a reduced type of single components.
   - **The human brain:** the brain, the most complex multimedia system, is able to feedback the existing knowledge with recently acquired information through neural connections.
   - **The value of an image:** Visual capacity of a human-being allows simplifying and understanding complex systems at one sight.

2. **A new authoring concept that enables creation, deployment and control of multimedia distributed systems**



Internet Connection Map

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. 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.

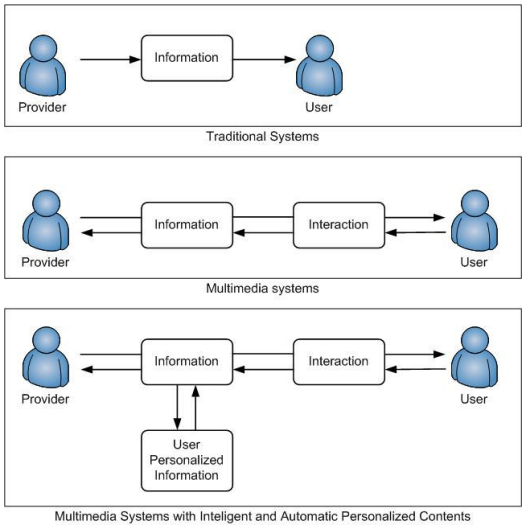
ii. Creation, Deployment and Centralized Control of Distributed Systems: another key issue is the creation, deployment and start-up of such systems. There're still no solutions for handling the complexity these type of new multimedia solutions enclose: linking, testing, controlling and updating them is not obvious.

3. A new authoring concept that enables storage, search and manipulation of information

Information Control has become one of the pillars of our Information-based society. Information itself and its organisation is a key point for decision making. Information may be divided into two groups:

- Information about the distributed systems: multimedia contents, location, functioning, errors, etc.
- Information about the receptor of the message: interactive systems allow to know the profile of the receptor which is a key factor for the companies dealing with the end-user. This knowledge will let us explore new concepts of multimedia experiences.

4. A new authoring concept that enables multimedia systems information mining



Therefore the platform will allow searching for information and distributing it to specific targets 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 solutions developers will be able to create with an environment like this?

Let's think about a couple of scenarios that might occur in a near future and how the eMotional Environment would 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 likes. Even a mirror in the shop would show how the whole spring collection fits her/him, even before patronizing. Furthermore she/he could 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. In all this process the product is not present* (social networking).

Application of eMotional in Scenario 1:

This scenario describes a complex interactive (shopper - shopwindow) and context aware system (system – user). In this scenario the eMotional environment would be used to create the graphic user interface the user-shopper would interact with, integrating repositories of contents in different formats in the GUI (contents = realistic graphical representation of suits). Furthermore the eMotional Environment 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 eMotional in Scenario 2:

This scenario describes a complex distributed multimedia system. In this scenario the eMotional 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 eMotional Environment

All the eMotional partners are involved in the creation of art performances with a strong technological component and also in the development of complex audiovisual interactive systems. 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. (e.g. this strategy has allowed Emotique to show their work in more than 80 conferences and shows in 20 different countries).

This strategy will allow end-users of the eMotional Environment 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 eMotional consortium to propose the present project.

B.1.1.3 S&T Objectives

The main objective of the project is the creation of an Authoring Platform, that will provide the necessary tools for creating, developing, deploying and controlling Professional Complex Interactive and Context Aware Multimedia Systems, but also for making these systems

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

O1. Exploring the limits of the visual programming languages. Since the platform will enable non-expert users to (e.g. content creators) to easily program, deploy and control complex interactive multimedia systems, allowing them to experiment new ways of story-telling.

O2. Understanding which are the needs and limits of User Interfaces in the future multimedia systems. Exploring the relationship between users and multimedia systems in context aware systems that are highly reactive and interactive.

O3. Finding the best strategies for Multimedia Systems Communication & Synchronization, Storage & Retrieval that will support the Multimedia systems of the future, allowing creators to share and combine materials guaranteeing intellectual property rights of creators.

O4. To validate the environment it will be demonstrated in 3 different arenas: The Audiovisual Industry (contents and services), Academia/Research, Arts & New Technologies.

O5. 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 target a) *"Advanced **authoring** environments for the creation of **novel forms** of interactive and expressive content enabling multimodal experimentation and non-linear story-telling"* since it proposes an Authoring Platform that will enable integration of input/output devices of different classes, as well as commercial authoring software components, 3D engines, 3D rendering components, etc. (Objectives O1, O2).

The Work Programme also states that *"these environments will ease content sharing and remixing, also by non-expert users, by automatically tagging content with semantic metadata and by using open standards to store it in networked repositories supporting symbolic and similarity-based indexing and search capabilities, for all content types"* which is also in line with objective O3.

Furthermore, the work programme's target states that it's expected to obtain *"c) Architectures and technologies for **personalised distribution, presentation and consumption** of self-aware, adaptive content. Detecting and exploiting emergent ambient intelligence they will use features embedded in content objects and rendering equipment to enable dynamic device adaptation, immersive multimodal experiences and contextual support of user goals and linguistic preferences"*. Since the eMotional Environment will contain the tools that will make possible to turn simple multimedia systems into reactive systems able to identify the user and provide the content that suits him/her the project perfectly fits the proposed target.

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

Authoring tools are the interfaces of the authoring system to the authors. In focus are interactive graphic tools for the support of an intuitive work during the authoring process. A typical authoring tool contains **several editors**, which create and edit scene data stored in XML-based authoring formats. Furthermore, scene data can be edited on source code level. In the case of collaborative authoring an authoring tool is connected to an authoring server. An autarkic use is also possible. The developed concepts are oriented towards the possibilities of MPEG-4, but they are transferable to other multimedia applications which are based on a scene graph. With these concepts and components both can be realized, universally applicable as well as specialized authoring systems and tools. Several exemplary applications show the operability of the developed components

The proposal will observe the **authoring process of object-based AV applications** according the object and scene concept of MPEG-4. The object-based approach embraces the extended interactive opportunities of multimedia applications as well as the distribution opportunities and the quality level of audiovisual media. The object and scene concept is described in the MPEG-4 standard which is an important step toward the convergence of electronic media. The production of object-based AV applications has profound effects on the whole digital media chain. Especially the production process changes dramatically. The existence of efficient authoring tools and systems is an important requirement for the success of such applications. The goal of this work was the development and exemplary implementation of concepts and components for an authoring system for object-based AV applications with support of a collaborative work of several authors.

The main areas of research within the eMotional project are Visual Programming Languages, Synchronization and Communication of Multimedia Systems and Storage and Retrieval of Mutimedia Contents, which are developed in the following sections.

Furthermore eMotional will be an insight to the uses and practices of the interactive multimedia of the future.

B.1.2.1 State-of-the-art in Visual Programming Languages

Visual Programming Languages (or VPLs) have different applications. Among all of them, providing with a set of tools for the integration of different multimedia technologies in creative and technical applications. The ideal VPL should permit the interactive building of applications out of components, enhancing the entire R&D workflow and providing for application prototyping, empirical experimentation, collaborative work, software recycling and simplified maintenance.

A brief State of the Art
It's been a long time using component technologies (COM, CORBA) and schematics to represent complex processes (Maya, Combustion, Reaktor). Pd is another well known instance of a general purpose component-based graphical environment, initially developed for real time music generation, and possibly for this reason too focused on programmability, which makes it difficult for non-technicians to understand. It also lacks advanced features for developers, which can not deal with an intermediate layer between the GUI and its components.

DirectShow uses a graphical representation greatly inspired by electronics schematics, but is only meant for software developers. Touch is a great example of parametric controlling of graphics effects, but is a tool only aimed at artists. Max/MSP and VVVV are Pd-like environments, strong on image processing and hardware device interconnection respectively but with the same limitations as Pd.

There are highly specific tools designed for *education* (Alice developed by researchers at Carnegie Mellon to address three core problems in educational programming; Turtle Art, a turtle graphics language for children on the OLPC XO-1, inexpensive laptop computer intended to be distributed to children in developing countries around the world, or Opsis, a Java-based applet for teaching data structure algorithms combining programming, proof, and animation to enhance the learning experience, among others), *concurrent programming* (Petri Nets World, a graphical appealing language; SCIRun, a scientific environment where large computer simulations can be composed, or CODE, a visual parallel programming system that composes sequential programs into parallel schemes for shared-memory multiprocessors and workstations), *web management and creation* (Flow, designed to simplify tedious, difficult to maintain or error prone aspects of integration/B2B activities; WireFusion for creating interactive 3D web presentations, or the Tersus Platform, that uses flow diagrams instead of writing code) and *music authoring* (jMax, for building interactive and real-time music compositions, OpenMusic, for music creation and SynthMaker, an audio programming tool using a visual programming language) or even in *videogame development* (Virtools, prototyping, rapid development besides web marketing and virtual product maintenance, Alien Brain, a digital asset management system for artists in the entertainment industry, or Wwise, a music creation tool specifically designed for fitting in the game industry), among lots of other activities (Agilent VEE, CodeMorphis Synopsis, Fabrik, Libero, Sanscript, Visula, etc.).

Where eMotional progresses beyond the state-of-the-art in VPL
Let us list, in a sequential order, some of the key-features that the eMotional Project will address, from the developer's point of view:

- eMotional will permit creation and edition of scene data stored in XML-based authoring formats.
- Component architecture for the VPL will enable better software development and maintenance, and provides for a natural effort reutilization.
- Providing with a media independent core will allows the integration of new technologies transparently.
- The core should be optimized for dealing with really huge compositions, also from remote locations.
- A visual tool offers a clear and productive interface to work and interact, resulting in an enhancement of the workflow between artists and developers as it serves for rapid prototyping, effects modelling and experimentation.
- Some key multimedia technologies must be fully integrated to the general repository. We do not expect to invent what has been already presented!.

Please see references about Visual Programming Languages in B6.1

B.1.2.2 State-of-the-art in Synchronization and Communication of Multimedia Systems

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.

A brief State of the Art
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.

Please see references about Multimedia Synchronization and Communication in B6.2

B.1.2.3 State-of-the-art in semantic information retrieval

Semantic audio analysis refers to the enrichment of digitized audio recordings with descriptive metadata tags allowing for advanced database search or further processing. Nowadays, metadata description of audio is mostly given by catalogue-oriented classification. Unfortunately, this labelling according to predefined categories is cumbersome and time-consuming. Automatic content-based metadata generation promises cost-efficient, scalable markup, but is still not advanced enough although some automatic annotation methods give robust and efficient results and are now starting to be available commercially.

Audio annotation

Digitized audio recordings can be categorized and segmented into temporal parts regarding multiple aspects. Unlike in audio identification tasks [Herre2004], [Cano2005b], annotation aims at a more fuzzy distinction between important audio domains and signals [Blei2003]. General audio classification schemes normally concentrate on small domains, such as musical instrument classification [Herrera2003] or very simplified audio taxonomies [Wold1996], [Lu2005]. The current state-of-the-art in automatic audio classification is far from identifying any imaginable sound source and doing so with a high detail (e.g. distinguish different animals' voices from a rainforest ambiance) [Herrera2005]. In audio classification, researchers normally assume the existence or define a well defined hierarchical classification scheme of a few categories (less than a hundred at the leaves of a classification tree). Moreover, unless some context is given, audible sounds tend to be ambiguous: Hissing sounds can be created by "cats", "tea boilers", "snakes". In fact, folly and special effects artists exploit this ambiguity and create the illusion of "crackling fire" by recording "twisting cello-phone". In the AUDIOCLAS project [AUDIOCLAS] a general framework for sound annotation was developed. For further discussion on classification of general sound, we refer to [Cano2005a] for suitable features see [MPEG7].

Music annotation

The MusicGenome project [Pandora] needed five years for a group of dozens of experts to manually annotate only 300,000 songs. Automatic systems, like those developed in the context of SIMAC [SIMAC], promise to be able to index music much more efficiently, techniques range from low-level description of the music to human readable high-level metadata. An overview of Music Information Retrieval (MIR) is given in [Downie2003], first experiments with content-based MIR are reported in [Foote1999], [Tzanetakis2000] and [Tzanetakis2002]. Among the different salient aspects relevant to the perception of music we can distinguish between melody [Gomez2006],

rhythm [Gouyon2005], instrumentation [Kitahara2006], singer voice characteristics [Bartsch2004], and others. A lot of research is still devoted to develop new algorithms as well as adapt others so that they are both accurate and efficient. For example there exist various approaches for vocal segment detection in a tune or other approaches that just divide dissimilar from similar segments for further analysis in the low-level feature space [Ong2005]. One of the most interesting properties of a piece of music is its genre. While genre categorization by humans often lacks its subjective nature, this task can be tackled in an automated manner with good accuracy. The most widely acknowledged musical styles, such as jazz, classical, rock etc. can be classified automatically using methods of data mining and statistics in a supervised pattern-recognition system. Other useful properties can be robustly determined, such as the tempo, key, intensity and instrumentation of a music piece.

Content-based Search

The idea of content-based retrieval has been around for more than a decade. Its aim is to use features of multimedia objects directly for retrieval, and one of the main paradigms is query-by-example. The main architecture of content-based retrieval systems is based on low-level features, each of which would typically be a vector or numbers. Most systems accumulate the distances of these features to the corresponding features of the query with a view to establish an overall distance of the query example to the objects previously stored in a database. In addition to this, many systems allow a multimodal query encompassing, for example, camera movements, high-level scene description (indoor/outdoor/studio setting).

Amongst other solutions there are those that seek to reformulate the query [Ishikawa et al 1998] or those that weight the various features differently depending on the user's feedback. Weight adaptation methods include cluster analysis of the images [Wood et al 1998]; transposed files for feature selection [Squire et al 2000]; Bayesian network learning [Cox et al 2000]; statistical analysis of the feature distributions of relevant images and variance analysis [Rui et al 1998]; and analytic global optimisation [Heesch and Rüger 2003]. Some approaches give the presentation and placement of images on screen much consideration to indicate similarity of images amongst themselves [Santini and Jain 2000; Rodden et al 1999] or with respect to a visual query [Heesch and Rüger 2003]. See also WP8.

There is a *responsiveness problem*, too, in that the naive comparison of query feature vectors to the repository feature vectors requires a linear scan through the repository. The problem is that high-dimensional tree structures tend to collapse to linear scans above a certain dimensionality [Weber et al 1998]. Some methods such as PCA can be used to reduce the dimensionality but suffer from a high complexity at indexing time and difficulties for incremental indexing; other more promising methods involve the geometric aggregation of correlated features [Huang et al 2005, 2006]. Some approaches for fast nearest-neighbour search use compression techniques to speed up the disk access of linear scan as in [Weber et al 1998] using VA-files; or they approximate the search [Nene1997]; decompose the features component-wise [Aggarwal2000], saving access to unnecessary components.

Where eMotional progresses beyond the state-of-the-art

We plan to enhance existing search strategies by query enhancement through domain knowledge. This will be realized by employing ontologies (RDF, OWL) specifically filled with a basis-set of information and constantly evolving with new input. The real-world problem of weak classifiers will be addressed by combining ontology-based reasoning with an ADA-BOOST like information

aggregation approach. We will also investigate advanced models of user adaptive multimedia information retrieval such as Probabilistic Latent Semantic Indexing as a means of reducing both the dimensionality of the data representation and the effects of semantic noise along with associated problems such as polysemy and synonymy. In addition, we will investigate such models based on combined Hidden Markov Modelling, Support Vector Machines and Independent Component Analysis. The design of such algorithm constitutes an advancement from the state of the art of multimedia information retrieval as it will combine three distinct forms of information filtering: content-based, user-based and community-based. Issues of effectiveness and efficiency of the algorithm and the module will be assessed systematically. The effectiveness of the learning will be evaluated using some suitable test collection and following a methodology similar to that employed in the TRECVID and MIREX. The efficiency of the module in terms of speed and memory requirements will be assessed using up-to-date software testing and refinement methodologies. In this respect, a significant risk could be related to the scalability of the models complexity to real tasks. We will address this risk through an evaluation that will involve incrementally large test collections and statistical analysis of the effectiveness of the models proposed. If necessary, a trade off between effectiveness and efficiency will be made.

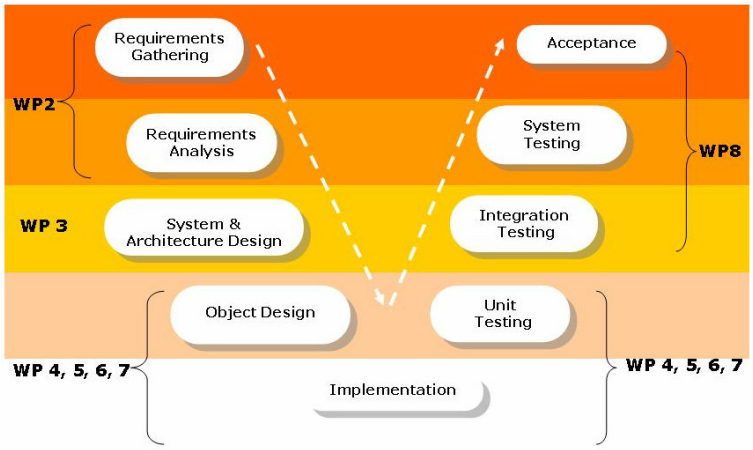
Please see references about Semantic Information Retrieval in B6.3

B.1.3 S&T methodology and associated work plan

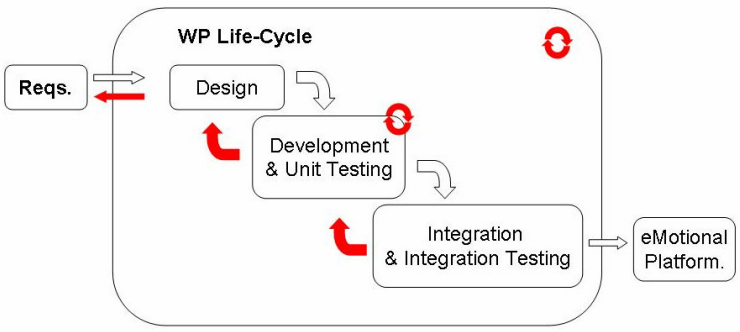
B.1.3.1 Overall Strategy of the Work Plan

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 eMotional 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 keeping a **sound control of versioning** for all the items produced during the project: requirements documents, design documents, source code, tests, graphical designs, artistic

productions, etc. 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 or design documents. The introduction of **Bug Tracking tools** (BugZilla, JitterBug, RT…) will also be analysed to assure this constant feedback.

B.1.3.2 GANTT Chart

	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	WP Leader
WP1 - Project Management & Plan for Quality Assurance.																															EMO
T1.1. Project Technical and Financial Management:																															
T1.2. Project Quality Assurance																															
WP2 Requirements Gathering and Analysis																															EMO
T2.1. Review of technological background, market and user requirements.																															
T2.2: eMotional Environment Requirements																															
T 2.3: Identification of future uses of the eMotional Environment																															
WP 3 Architectural Design																															FHF
T3.1. Architectural Design.																															
WP4 Multimedia Content Creation Layer																															LAS
T4.1 Theoretical approach for the programming language																															
T4.2 Design of the multimedia creation layer																															
T4.3 Development and testing of the multimedia creation layer																															
T4.4 Integration of the Multimedia Creation Layer into the eMotional Environment																															
WP5 Multimedia Systems Synchronization and Communication Layer																															C3
T5.1 Selection and extension of the S&C Strategy																															
T5.2 Design of the S&C layer																															
T5.3 Development and testing of the S&C Strategy																															
T5.4 Integration of the S&C Strategy into the Platform																															
WP6 Intelligent Information Storage & Retrieval																															FHF
T6.1 Design of Intelligent Multimedia Storage & Retrieval Concept																															

	M01	M02	M03	M04	M05	M06	M07	M08	M09	M10	M11	M12	M13	M14	M15	M16	M17	M18	M19	M20	M21	M22	M23	M24	M25	M26	M27	M28	M29	M30	WP Leader
T6.2 Develop. and Unit Testing of IM Storage & Retrieval Concept																															
T6.3 Integration of the IM Storage & Retrieval Concept																															
WP7 eMotional Environment Community of Creators																															DER
T7.1 Design of the Collaborative Platform																															
T7.2 Design of Distributed Storage Structures																															
T7.3 Development & Unit Testing of Collaborative Platform																															
T7.4 Integration in eMotional Environment																															
WP8 Demonstration of the eMotional Environment																															C3
T 8.1 Demonstration in the Audiovisual Content Industry.																															
T 8.2 Demonstration in the Arts & Technology sector.																															
T 8.3 Demonstration in the Multimedia R&D community.																															
T 8.4 Demonstration in the Commercial Sector.																															
WP9 Dissemination & Exploitation																															EMO
T 9.1. Dissemination & Networking strategy definition. Action Plan design.																															
T 9.2. Dissemination material preparation.																															
T 9.3. Development of dissemination & networking activities.																															
T 9.4. Impact assessment.																															
T 9.5. Exploitation plan design.																															

B.1.3.3 Detailed Work Plan

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	7	8
Participant short name	EMO	FhD	C3	DERI	MED	URL	PLA	LeLab
Person-months per participant	9	1	1	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, 30
D1.1.5 to D1.1.6 Yearly Management Reports. Month 12, 24, 30
D1.1.7 Final Report. Month 30
D1.2.1 Project Quality Plan. Month 3
D1.2.2, D1.2.3 Financial reports And Audits. Month 12, 24, 30

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**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	11,5	2,5	1,5	1,5	2,5	2,5	2,5	3,5

Objectives:

- To review the **current SoA and technology background** and define the basic system requirements.
- To feed the basic set of requirements with **business requirements**.
- To define a **generic model** that describes the rules governing the platform based on the requirements analysis in order to identify future uses of the platform 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 authoring of audiovisual and interactive contents. The objective of this deep analysis of the state of the art of the existing technologies in the sector is *identifying the **basic set of requirements** of the eMotional Environment.*

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 following the **Volere®** methodology. It will also be studied the possibility to use a software application to manage the collection of requirements.

Task 2.1: Review of technological background, market and user requirements.
Usability, efficiency, portability, maintainability and integrability of existing authoring tools shall be deeply analysed in order to compile the most convenient features for the eMotional Environment. As the eMotional Environment proposes a new visual programming approach VPLs trends will also be analysed in depth. Other issues that will need further attention are:

- Multimedia storage and search and
- Multimedia Synchronization and Communication.
- Most common business practices will also be identified and their shortcomings will be analysed.

Task 2.2: eMotional Environment Requirements
Based on the analysis of the existing authoring tools, trends in VPLs, Multimedia Storage, Search, Communication and Synchronization, together with the business practices the set of requirements for the eMotional Environment will be identified.

Task 2.3: Identification of future uses of the eMotional Environment
The visual programming language in the eMotional Environment wants to become a standard for the multimedia industry define a generic model that describes the rules governing the platform processes based on the requirements analysis in order to identify future uses of the platform in other industrial sectors.

Deliverables:

D2.1 Existing Practices and State-of-art in Visual Programming Languages. Month 3
D2.2 Existing Practices and State-of-art in Multimedia Storage and Search. Month 3
D2.3 Existing Practices and State-of-art in Multimedia Synchronization and Communication. Month 3
D2.4 eMotional Environment Requirements. Month 6
D2.5, D2.6 Future uses of the eMotional Environment. Month 18, Month 30

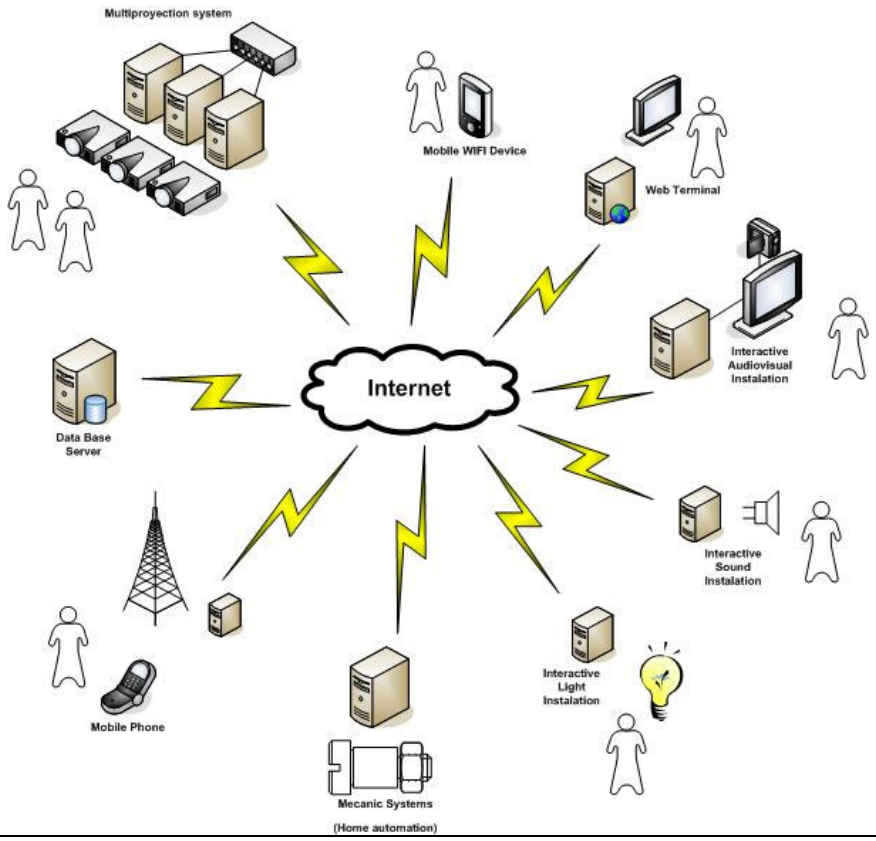
Work package number	WP3		**Start date / starting event:**		M5		
Work package title	Architectural Design						
Activity type	Research & Technical Development						
Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	1	6	0	0	0	1	0	0

Objectives

- To identify a **common technical framework** for the different layers of the authoring environment

Description of Work

In the present WP it will be proposed the most adequate architectural design required for a complex distributed system as the one the eMotional Environment proposes. Herewith it'll be defined the different software components that will compose the platform, 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 environment.



T3.1: Architectural Design.

Elaboration of the Architectural Design Document that encloses the basic main ideas for the creation of the eMotional Environment at a functional, structural and physical level.

This document shall:

- justify and develop the architectural pattern 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 different functional or logical views of the platform after analysing the collection of requirements.
- identify the structure required to implement the chosen pattern
- identify the physical requirements (installable software components, database management systems, hardware infrastructure, software libraries, development toolkits, operative systems, etc)

Deliverables:

D3.1: Architectural Design. Month 12

Work package number	WP4		**Start date / starting event:**				
Work package title	Multimedia Content Creation Layer						
Activity type	Research & Technical Development						
Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	8	12	0	0	7	15	3	3

Objectives

- Establishing the theoretical approach for the programming language that will be part of the eMotional Environment.
- Designing, developing and testing an easy-to-use, easy-to-learn, modular and open language for the fast creation and integration of multimedia contents.

Description of Work

Based on the results obtained in WP2 (study of the technological background of visual programming languages for the multimedia authoring systems performed and the specific requirements of the platform) it will be established a **theoretical approach** for the visual programming language that will be part of the eMotional Environment.

From this approach the **new visual programming language** will be designed, implemented and tested. The design of the new visual programming language must fulfil the following premises:

- 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 creation of non-linear contents

The platform will also provide a repository of components as well as an API for the creation of new multi-purpose components. The basic multimedia components the platform shall provide are:

- **Input Components:** Camera Image Capture, Bluetooth communication, keyboard, mouse or joystick, MIDI, DMX, OSC, etc
- **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, etc.

T4.1 Theoretical approach for the programming language
Definition of the theoretical approach for the VPL proposed.

T4.2 Design of the multimedia creation layer
Design of the console for graphic development integrating the VPL theoretical approach .The issues that shall be designed under this task are:

- Design of the interaction concept between the end-user and the platform.
- Design of the components repositories: graphical representation of components and interrelations.
- Design of the scripting utility for the creation of new components.

T4.3 Development and testing of the multimedia creation layer
Development and unit testing of the issues designed in the previous task.

T4.4 Integration of the Multimedia Creation Layer into the eMotional Environment & Integration Testing
Following a bottom-up approach the present layer will integrated into the definitive architecture once it has been unit tested.

Deliverables:

D4.1: Theoretical Approach for an eMotional VPL. Month 10
D4.2 Design of the multimedia creation layer. Month 16
D4.3. Source Code & Tests of Multimedia creation layer. Month 24

Work package number	WP5			**Start date / starting event:**			
Work package title	Multimedia Systems Synchronization and Communication Layer						
Activity type	Research & Technical Development						
Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	6	12	11	4	3	4	0	0

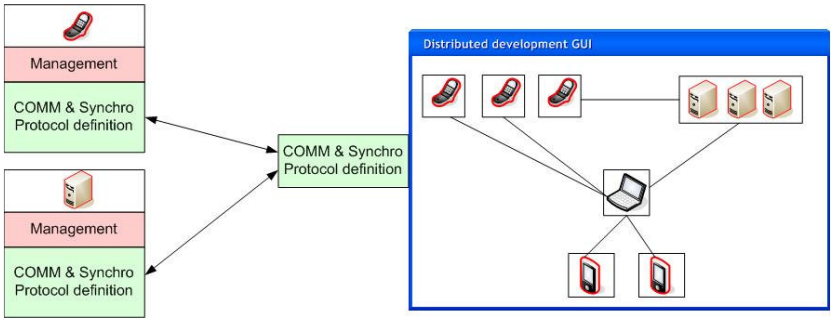
Objectives

- Identifying the most suitable Multimedia Sychronization and Communication Strategy to be integrated into the eMotional environment.
- Designing, developing and testing Multimedia Sychronization and Communication Strategy to be integrated into the eMotional environment..

Description of work

It must be selected the most appropriate Synchronization and Communication Strategies for the eMotional Environment that gives response to the requirements identified in WP2. These solutions may solve transmission and synchronization of continuous data (video and audio streams) and discrete data (control information, text, single images, etc) that may be interactive or not.

Synchronization at the presentation level of the several media elements (objects, data entities and media streams) in its different phases (generation, manipulation, storage, communication and presentation) is a key issue for the multimedia product not to be a complete chaos. Moreover when it's a distributed multimedia system, because synchronization information and media objects are stored in separated sources and communication delays may easily occur owing to external causes.



Task 5.1 Selection and extension of the Synchronization and Communication Strategy
Actual strategies as Global Timer, Reference Points, Event Based Synchronization and others shall be deeply studied. It will also be studied the necessity to combine and extend them for the requirements of the project.

Task 5.2 Design of the Synchronization & Communication Layer
The environment will allow to create different topologies for a distributed 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 Layer that complies with the graphical conventions established during the Content Creation Layer design.
- A Repository of implemented Protocols (legacy or novel) that may be used.
- A Management Layer that interfaces graphical and protocols layer.

T5.3 Development and testing of the Synchronization and Communication Strategy
Development and unit testing of the issues designed in the previous task.

T5.4 Integration of the Synchronization and Communication Strategy into the eMotional Environment & Integration Testing
Following a bottom-up approach the present layer will be integrated into the definitive architecture once it has been unit tested.

Deliverables:

D5.1: Synchronization and Communication Strategy. Month 11
D5.2 Design document of the Synchronization& Communication layer. Month 17
D5.3 Source Code & Tests of the Synchronization and Communication Layer. Month 25

Work package number	WP6		**Start date / starting event:**		M12		
Work package title	Intelligent Information Storage & Retrieval						
Activity type	Research & Technical Development						
Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	3,5	12	0	6	0	3	0	0

Objectives

- Identifying the most suitable Intelligent Multimedia Storage & Retrieval Concept to be integrated into the eMotional environment.
- Designing, developing and testing Intelligent Multimedia Storage & Retrieval Concept to be integrated into the eMotional environment..

Description of work

In this work package, the research is focused on semantic analysis of audio and visual information in consideration of text-based annotation and summarizations. The research work essentially evolves around intelligent AV content analysis to address the problem that text-based semantics added at production end fail to provide detailed semantics for reliable match and learning of the users' profile in media consumption.

T6.1 Design of Intelligent Multimedia Storage & Retrieval Concept

Based on existing research strength and the completed work from previous projects, FhG-IDMT will select a range of low-level video processing algorithms for evaluation, assessment, and selection of basic video analysis tools. These include: video shot cut detection, spatial semantic objects segmentation and MPEG-7 compliant content descriptors. In addition, some further mid-level video processing tools directed towards high level video content analysis will also be developed, which include:

- Temporal video scene segmentation, where video shots are divided into sections and each section only contains consistent visual content to enable the high-level visual content analysis to be conducted in terms of these content consistent sections/scenes rather than the video shots.
- Semantic object segmentation, where a range of semantic objects meaningful for human understanding will be singled out for further content analysis. These objects include moving objects, such as human, animals, running vehicles etc., and still objects such as buildings, sky, coast, water etc.
- Feature extractions to include essential content features such as colour, texture, shape, contour etc. and the combination of these features could provide inputs for high-level content analysis and recognitions.
- Close-up detection to identify human facial regions sufficient for recognition.
- In-door activity detection to identify scenes, where dialogues will provide important inputs

for event analysis to generate reminders.
- Crowd detection to count the number of people being present.
- Season and day-time detection

Automatic, semi-automatic and manual annotation tools will provide both on-line and off-line content annotations. Automatic annotation will be conducted in terms of temporal sections as divided by segmentation algorithms. A dictionary of key words will be designed manually to reflect the users' individual needs, and semantics features will be used to classify frames, scenes, and hence linked to annotation words via pattern recognition and machine learning approaches. Suitable data exchange formats for semantic information (textual) as well as binary low- and mid-level features will be defined. Methods for automatic annotation of audio on a coarse level will be developed or enhanced. These comprise stream segmentation with regard to different audio domains. Amongst these are:

- Discrimination between speech, environmental and effect sounds, music and mixture forms of these. For the different scenarios, specialized algorithms for automatic fine granular labelling will be deployed.
- For music content, these comprise e.g. genre classification, tempo and beat analysis, key detection, harmonic progression and according complexity estimation.
- For speech content, different speakers will identified and characterized (male, female, child, prosody, emotion).

A comprehensive hierarchical classification framework will be established for environmental sounds to reach a fine granular categorization level, e.g. car-chase, explosions, nature, animals, etc.

T6.2 Development and Unit Testing of Intelligent Multimedia Storage & Retrieval Concept
Development and unit testing of the issues designed in the previous task.

T6.3 Integration of the Intelligent Multimedia Storage & Retrieval Concept into the eMotional Environment & Integration Testing
Following a bottom-up approach the present layer will integrated into the definitive architecture once it has been unit tested. Furthermore, the preceding sub-tasks will be suitably combined to enable a high-level characterization of multimedia content with relevance for intelligent content storage and retrieval. The entire portfolio of automatically extracted information in textual, symbolic and binary format will be delivered to the related work packages to enable similarity search, browsing, complementary search and visualization as well as semantic reasoning.

Deliverables:

D6.1: Intelligent Multimedia Storage & Retrieval Concept Design. Month 17
D6.2 Intelligent Multimedia Storage & Retrieval Concept Source Code & Test. Month 26

Work package number	WP7			**Start date / starting event:**		M13	
Work package title	eMotional Environment Community of Creators						
Activity type	Research & Technical Development						
Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	4	12	0	13	0	3	1	1

Objectives

- Investigate new trends to collaborative interchange of contents
- Design and develop a collaborative platform for content interchange
- Design and develop means for distributed content storage

Description of work

T7.1 Collaborative Multimedia Research

New trends to collaborative interchange of interdisciplinary contents: programming, design, video/audio production, etc tagging,

T7.2 Design and development of the Collaborative Platform

This task will design and develop a collaborative platform for uploading, downloading, and sharing of content and metadata. For the latter, appropriate existing P2P solutions will be selected and used. The platform will also include community features such as discussion forums, content and metadata rating and tagging, and features derived from the investigation in T7.1.

In order to address copyright issues, this task will also develop the necessary means to declare and register content rights, and track / inform users about those rights and terms of use at any time during the collaborative process. Various license schemes ranging from “all rights reserved” to “some rights reserved” content (i.e. CreativeCommons) will be supported.

As for related security issues, e.g. regarding content authenticity, ownership and copyright information, or to support secure communication, this task will also**:**

- choose an adequate Public Key Infrastructure
- develop components for the registration and certification of users and systems actors
- develop appropriate formats, tools and protocols to encrypt / decrypt, and sign / authenticate metadata and rights information via digital signatures, and to securely bind metadata to content

The developed components will be integrated both into the platform, and into other parts of the distributed system (see T7.3).

T7.3 Design and development of Distributed Storage Structures

This task aims at designing and developing all means for distributed storage of content including text, image, video, audio data and executable code, including versioning of data. It will be tightly connected with platform design and development in T7.2.

Wherever necessary, security components developed in T7.2 will be integrated into the relevant parts of the system, e.g. in order to sign information or secure communication

D7.1 Design of the Collaborative Platform, Month 21

D7.2 Design of the Collaborative Platform, Month 26

Work package number	WP8		**Start date / starting event:**		M21		
Work package title	Demonstration of the eMotional Environment						
Activity type	Demonstration						
Participant number	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Participant short name	**EMO**	**FhD**	**C3**	**DERI**	**MED**	**URL**	**PLA**	**LeLab**
Person-months per participant	4	1	9	1	4	1	4	7

Objectives

• Demonstrate the eMotional Environment in 3 demonstration actions of different sectors.

Description of work

Validity of the eMotional Environment will be demonstrated in 4 interactive multimedia applications of different application sectors spread all over Europe. (The images bellow present real interactive installations made by some of the partners in the consortium as an example of the types of demonstration actions that will be performed within the eMotional project).

Task 8.1 Demonstration in the Audiovisual Content Industry.

This action will demonstrate the validity of the platform for:

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

This demonstration will be held in Germany led by Media+Space.

Task 8.2 Demonstration in the Arts & Technology sector.

This action is carried out to demonstrate the applicability of the platform for the arts&technology sector which requirements are very demanding. Some of the aspects that will be validated are:

- combination of audiovisual contents together with highly immersive interactive experiences
- remote control of the sets, as well as its back-up capacity

These demonstrators will be held in C3 (Hungary) and Le Laboratoire (France).

Task 8.3 Demonstration in the Multimedia Industry.

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 screens

This demonstration will be held in Spain led by PlanoMar (Finland).

Task 8.4 Demonstration in the Multimedia R&D community.

This demonstrator will explore new applications for the platform. A proposed demonstrator is the integration of different interactive actuators such as cameras and gloves e.g. for gesture interpretation of sign-language that may be translated to audio signals before an audience without hearing disabilities. Another demonstrator that is enclosed within this typing is the one held in Le Laboratoire, which crosses Art, Technology and Scientific research.

These demonstrators will be held in Spain led by URL and France led by Le Laboratoire.

Deliverables

D8.1 Demonstrator for the Audiovisual Content Industry: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator. Month 24

D8.2 Demonstrator for the Arts & Technology Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator. Month 28

D8.3 Demonstrator for the Commercial Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator. Month 30

D8.4 Demonstrator for the Multimedia R&D Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator. Month 30

Work package number	WP9		**Start date / starting event:**			M1	
Work package title	Dissemination and Exploitation.						
Activity type	OTH						
Participant number	1	2	3	4	5	6	7	8
Participant short name	EMO	FhD	C3	DERI	MED	URL	PLA	LeLab
Person-months per participant	12	4,5	4,5	4,5	4,5	3	3	3

Objectives

The main objective of Workpackage 9 is to **assure maximum impact** of eMotional 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, eMotional will define in a very early stage a clear dissemination strategy and detailed dissemination plan for the whole project duration. Also at month 3 eMotional 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. eMotional will actively cooperate with running EU FP6 & FP7 RTD projects and also related Technology Platforms.

Description of work

Task 9.1. 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 9.2. Dissemination material preparation.
Once the "tools" are defined eMotional will select the "how" to disseminate (the dissemination material). This material will include web site, newsletters, papers and project brochure and other less conventional dissemination channels such as setting up of clinics and working groups or thematic events.

Task 9.3. 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 eMotional 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 9.4. 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 9.5. 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 eMotional project partners and a Memorandum of Understanding.

Deliverables

D9.1.1 Dissemination & Networking strategy and plan as the first version of the PUDK. Month 3.
D9.1.2. Final version of PUDK. Impact assessment – Dissemination evaluation report. Month 29.
D9.2. Dissemination material. Months 6-30.
D9.3.1-4 List of dissemination & networking events. Months 6, 12, 20, 30
D9.4 List of impact indicators. Month 15.
D9.5.1 Preliminary Exploitation Strategy. Month 6.
D9.5.2 eMotional Exploitation Plan. Month 24

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	16	1	30
2	Requirements Gathering and Analysis	RTD	1	EMO	28	1	6
3	Architectural Design	RTD	2	FhD	8	5	10
4	Multimedia Content Creation Layer	RTD	1	EMO	40	10	24
5	Multimedia Systems Synchronization and Communication Layer	RTD	6	URL	40	11	25
6	Intelligent Information Storage & Retrieval	RTD	2	FhD	24,5	12	26
7	eMotional Platform Community of Creators	RTD	4	DERI	34	13	27
8	Demonstrations of the eMotional Platform	DEM	3	C3	31	20	30
9	Dissemination & Exploitation	RTD	1	EMO	39	1	30
	TOTAL				**260,5**		

[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	M30
D1.2.1	Project Quality Plan	WP1	R	R	M3
D2.1	Existing Practices and State-of-art in Visual Programming Languages	WP2	R	P	M3
D2.2	Existing Practices and State-of-art in Multimedia Storage and Search.	WP2	R	P	M3
D2.3	Existing Practices and State-of-art in Multimedia Synchronization and Communication	WP2	R	P	M3
D2.4	eMotional Environment Requirements.	WP2	R	R	M6
D2.5	Future uses of the eMotional Environmen (Draft).	WP2	R	P	M18
D2.6	Future uses of the eMotional Environment (Definitive).	WP2	R	P	M30
D3.1	Architectural Design.	WP3	R	P/R	M12
D4.1	Theoretical Approach for an eMotional VPL.	WP4	R	P/R	M10
D4.2	Design of the multimedia creation layer.	WP4	R	R	M16
D4.3	Source Code & Tests of Multimedia creation layer.	WP4	Sw	R	M24
D5.1	Synchronization and Communication Strategy.	WP5	R	R	M11
D5.2	Design document of the Synchronization& Communication layer.	WP5	R	R	M17
D5.3	Source Code & Tests of the Synchronization and Communication layer.	WP5	Sw	R	M25
D6.1	Intelligent Multimedia Storage & Retrieval Concept Design.	WP6	R	R	M17
D6.2	Intelligent Multimedia Storage & Retrieval Concept Source Code & Test.	WP6	Sw	R	M26
D7.1	Design of the Collaborative Platform	WP7	Sw	R	M22
D7.2	Collaborative Platform Source Code & Test	WP7	Sw	R	M26
D8.1	Demonstrator for the Audiovisual Content Industry: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator.	WP8	Prot	P/R	M24
D8.2	Demonstrator for the Arts & Technology Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator.	WP8	Prot	P/R	M28

Deliverable	Deliverable name	WP Nr	Nature	Diss. Level	Delivery Date
D8.3	Demonstrator for the Commercial Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator.	WP8	Prot	P/R	M30
D8.4	Demonstrator for the Multimedia R&D Sector: Demonstration Deployment Plan, Execution Report & Audiovisual material of the Demonstrator.	WP8	Prot	P/R	M30
D9.1.1	Dissemination & Networking strategy and plan (PUDK V1)	WP9	R	P	M3
D9.1.2	Final version of PUDK. Impact assessment – Dissemination evaluation report	WP9	R	R	M29
D9.2	Dissemination Material	WP9	O	P	M6-30
D9.3.1-4	List of dissemination & networking events	WP9	R	P	M6, 12, 20, 30
D9.4	List of impact indicators	WP9	R	P	M15
D9.5.1	Preliminary Exploitation Strategy	WP9	R	C	M6
D9.5.2	eMotional Exploitation Plan	WP9	R	C	M29

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:

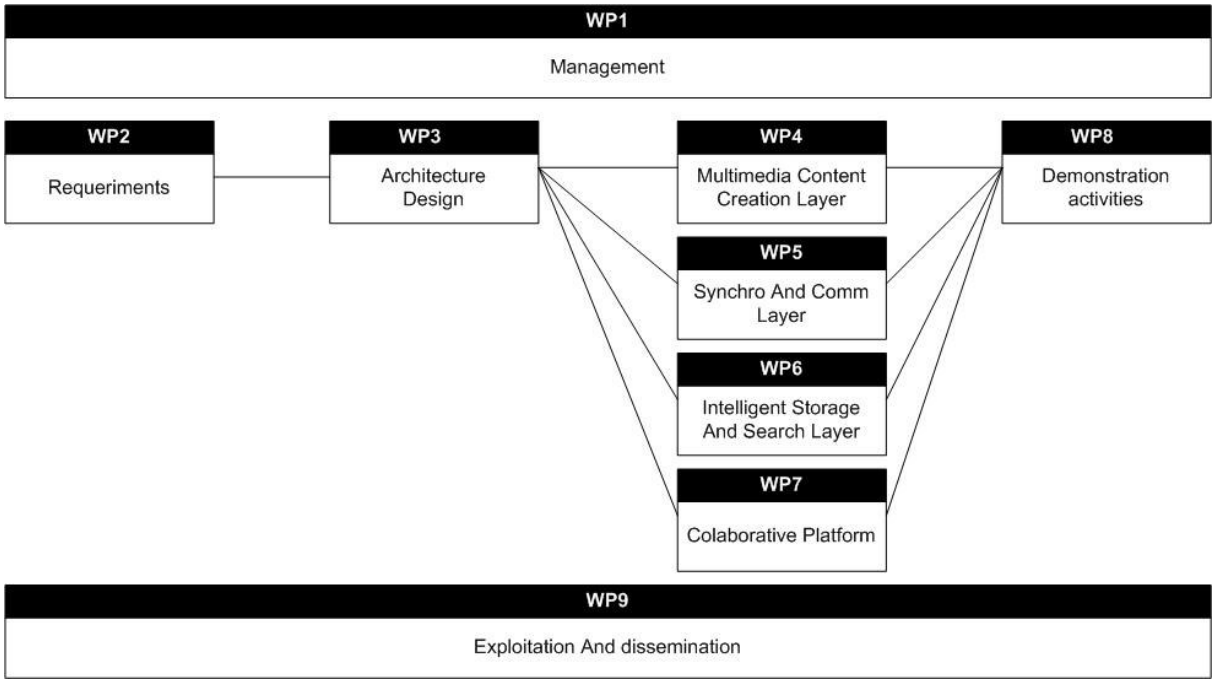
Nr	Milestone Name	WP	Date	Method of Verification
Mlstn1	eMotional Environment Requirements Approved by all partners and delivered to the Commission	WP2	M6	Source documents ready (D2.1, D2.2, D2.3), Requirements document (D2.4) and Requirements Review Report
Mlstn2	Architectural Design Approved by all partners and delivered to Commission	WP3	M12	Architecture Document Ready (D3.1) and Architecture Review Report
Mlstn3	Design of the eMotional Environment approved by all partners and delivered to Commission	WP4, WP5, WP6, WP7	M22	Design documents ready (D4.2, D5.2, D6.1, D7.1) and Design Review Reports
Mlstn4	Deployment of the eMotional environment and Validation	WP4, WP5, WP6, WP7, WP8	M30	Source Code ready, Unit and Integration Tests Executed (D4.3, D5.3, D6.2, D7.2) and eMotional Environment validated during demonstration actions (D8.1, D8.2, D8.3).

B.1.3.7 *Summary of staff effort*

Partic. Nr	Partic. Short Name	WP1	WP2	WP3	WP4	WP5	WP6	WP7	WP8	WP9	Total PMs
1	**EMO**	9	11,5	1	8	6	3,5	4	4	12	**59**
2	**FhD**	1	2,5	6	12	12	12	12	1	4,5	**63**
3	**C3**	1	1,5	0	0	11	0	0	9	4,5	**27**
4	**DERI**	1	1,5	0	0	4	6	13	1	4,5	**31**
5	**MED**	1	2,5	0	7	3	0	0	4	4,5	**22**
6	**URL**	1	2,5	1	15	6	3	7	1	4,5	**41**
7	**PLA**	1	2,5	0	3	0	0	1	4	3	**14,5**
8	**LeLab**	1	3,5	0	3	0	0	1	7	3	**18,5**
	Total	**16**	**28**	**8**	**40**	**40**	**24,5**	**34**	**31**	**39**	**260,5**

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 first and second work packages are oriented to obtain the basic requirements and technical specifications of the eMotional environment: RTD and industrial partners, as well as end-users will be involved in this relevant activity. Once this basis is settled, WP4 to WP7 will be executed almost in parallel by all the RTD partners depending on their area of expertise:

- Multimedia Content Creation Layer: Emotique and Fraunhofer
- Synchronization and communication Layer: La Salle
- Intelligent Storage and Search Layer: Fraunhofer
- Collaborative Platform: DERI

At the end of these activities its result will be validated in four demonstration activities.

B.1.3.9 Risks and associated contingency plans

Since the objective of the eMotional project is to develop a new authoring environment for the creation of multimedia applications, the project includes a number of risks, some of which are listed below:

- The key **RTD challenges** are in achievement of proper strategies in the 4 areas of the project (visual programming, synchronization & communication, multimedia storage & retrieval, including IPR 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 problem from the very beginning of the project, and this aspect will be led by partners with high expertise in technologies addressed.
- In order to keep tight connections of research activities with envisaged real industrial application, the work will be **based on four 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 results validity in the daily operation and feedback from the very beginning of the project. It will assure suitability of the developed technical solutions.
- The risk of the eMotional Environment not delivering adequate results will be avoided by focusing on scenarios with well encapsulated activities, allowing **stepwise introduction of the advanced results**. Furthermore, eMotional will apply mature technologies, with proven reliability, to back-up the innovative technical solutions. Finally, eMotional 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.
- Keeping in mind the complexity of the solution to be developed the time for the efficient development and testing of the eMotional 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.
- In order to reduce the development risks associated with the rather ambitious development objectives of the project, enabling the focus on key innovative aspects, eMotional 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 (see below) 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 eMotional 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:

- Business metrics,
- Technical metrics (requirements upon the services before/after eMotional):
    - Time to develop multimedia content
    - Time to integrate interactive technologies
    - Time to integrate audio/video technologies
    - Time to deploy interactive multimedia technologies in remote locations
- Metrics related to S&T objectives.

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

- The metrics related to the eMotional Environment 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.
- 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.
- In the validation phase based on the full prototypes the measurement of all defined metrics will be continued, according to the 4 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 eMotional solutions. In order to perform the above measurements, it is 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 of a standard multimedia interactive application, time needed to find relevant contents, 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, eMotional project management strategy is illustrated in the following figure:

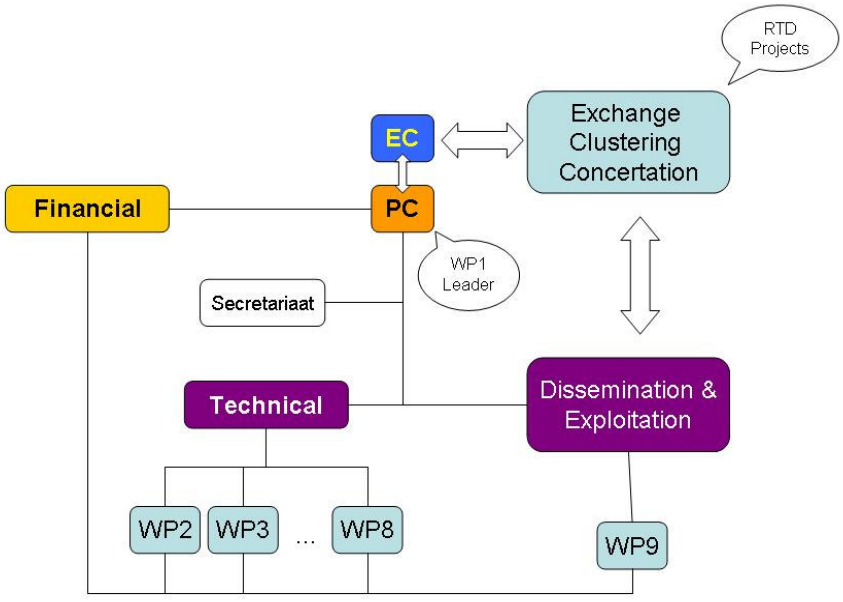


Figure 2.1-1: Management Organisational Scheme

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 eMotional meets its entire objectives on time, on budget, and with supreme quality results.

eMotional Project Intranet
The eMotional project will provide the necessary tools to facilitate communication among partners. 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 6: 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 eMotional 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 eMotional 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, eMotional 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 eMotional 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 eMotional. 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 eMotional.

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. 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. 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*

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 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.2.2.4 DERI

DERI Galway (National University of Ireland, Galway) is one of the leading research institutions in Semantic Web and Semantic Web services from Europe and abroad. With a broad set of projects in these areas, DERI Galway is researching and implementing innovative solutions to realize the vision of

Semantic Web services and Semantic Web. Three main areas of DERI Galway expertise are relevant to eMotional. First, in Semantic Web service area, DERI Galway is one of the leading contributors to Web Service Modelling Ontology (WSMO), the conceptual model for Semantic Web services, to Web Service Modelling Language (WSML), the associated family of representation languages for WSMO and the leader of Web Service Modelling Execution environment (WSMX), the execution environment for WSMO compliant Semantic Web services. Second, DERI Galway is deeply involved in making Semantic Web a reality. Successful research had been done in defining RDF query and transformation languages for Semantic Web (e.g., TRIPLE). Finally, DERI Galway has a vast experience in B2B process integration, mainly in ontologizing standards in this domain. The projects DERI Galway is involved are in range from basic research projects with an exploratory nature to applied projects that lead to industrial applications in the short term. Some of the most significant projects are: DERI Lion, DIP, KnowledgeWeb, SUPER, SWING, TripCom, SemanticGov and several other smaller projects. In addition to establishing research contributions, DERI Galway is involved in educational outreach as well as standardization activities in W3C and OASIS.

Short profile of the staff members/key experts:

David O'Sullivan (Ph.D.): Senior Academic at NUIG and Director of Research as CIMRU (cimru.nuigalway.ie). He is also co-founder and cluster leader of the international DERI (www.deri.org) based in the NUIG and the University of Innsbruck, Austria. His research interests are in innovation management where he directs a number industry sponsored research projects. His most recent projects include innovation management within SMEs and distributed innovation management across extended enterprises. David has over 80 publications including books - Manufacturing Systems Redesign (Prentice-Hall), Reengineering the Enterprise (Chapman & Hall) and the Handbook of IS Management (Auerbach). In 1995 he was honoured with the prestigious 'Outstanding Young Manufacturing Engineer of the Year' award by the Society of Manufacturing Engineers. He has worked on research and developments assignments with leading organisations including IBM, Thermo King, Fujisawa, Hewlett-Packard and Boston Scientific.

Ke Ning (Ph.D.): is a post-doc researcher at DERI. His research interests include Computer Integrated Manufacturing System, Business Process Modelling, Semantic Web Technologies, Collaborative Working Environment (CWE), Context-aware computing. He is now involved in two EU FP6 projects (Ecospace and inContext) regarding CWE. He joined DERI as a post-doc researcher in February 2006. Before that he was an IT-Specialist at IBM china. He received his Ph.D degree from Tsinghua University, Beijing, China in 2004. His thesis topic is about Study and Application of Business Process Modelling for Promoting Manufacturing System Integration.

B.2.2.5 *MEDIA + SPACE*

TAMSCHICK 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 eMotional project, since they will provide their point of view as an end-user for the elaboration of the set of requirements of the

eMotional 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 *Universitat Ramon Llull Fundació Privada (URL)*

Universitat Ramon Llull Fundació Privada (URL) 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 eMotional 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 eMotionalProject. 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 eMotionalProject 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 eMotionalProject 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.2.2.7 PLANOMAR

Planomar was founded in 1998. Among other activities Planomar has developed a screen resistant for ambient light (PlanoScreen). It takes light from a projector in a direct angle. Also it has unique brightness and viewing angle. Our future will be designing a new innovative interactive system by means of an infrared beam that can travel its way through the screen, opening a wide scale of new possibilities.

Our activities are based in Finland. Our first installations were done to a fare center, Helsingin Messukeskus, in Helsinki and one of the largest shopping malls, Idea Park, in Finland.

As we had opened our market in Finland we started working on Spain. First installation will be done soon in a shopping mall in Madrid. In the near future we are also going to start selling in France and England.

PlanoMar sees a great opportunity in being part of the eMotional consortium since the environment will let easily integrate the newest replay and interaction technologies. The eMotional environment will be used to set up running an interactive installation with Planomar's product.

Short profile of the staff members/key experts:

Christer Enqvist, CEO. The main focus of Christer Enqvist has been to represent and support mainly Scandinavian companies by opening doors and introducing their unique products and concepts internationally.

Jussi Rousi, Studies in University of Tampere focused on Mechanical engineering. Jussi Rousi has been working few years with FogScreen, the first walk through screen on the market. He recently designed a new system for Desinfinator Ltd. which will be able to kill bacterias and virus from airducts. It is expected that this company will now start rapid growth due to the new system. He has also been developing the concept of PlanoScreen.

Jose Leal, Sales Manager. BBA International Business, Bishop's University (Canada) & Bachelor in BBA Management UAX (Madrid). José Leal has being developing strategy projects for Accenture Consulting during 2 years on; Banca Mora, Bank East of Asia, Bank of Spain, Zurich Insurance, and Bankinter. Currently focus in High Tech process from Scandinavia, focus all effort in South European Countries, and American Market. His profile will be of a great interest for the exploitation work package.

B.2.2.8 Le Laboratoire

Imagined and founded by the scientist and Franco-American writer David Edwards, **Le Laboratoire** is a Non-profit cultural space dedicated to art and design experimentation inspired by an encounter and in collaboration with a leading international scientist. In fusing artistic and scientific visions, the creative process of artscience redefines itself outside traditional boundaries, no longer belonging solely within one discipline or another. This interdisciplinary approach becomes a catalyst for innovation that **Le Laboratoire** seeks to cultivate through its annual experiments. Opened in October 2007 Le Laboratoire has already organized four **experiments**, each one was the result of collaboration between an artist and a scientist:

- "Food for thought" by Fabrice Hyber and Robert Langer: From their collaboration the idea emerged to study the experience of a stem cell transforming into a neurone. Stem cell transformation is both at the cutting edge of medical science, whereby Robert Langer and his colleagues aim to heal brain injuries, and is metaphorical of intelligence itself.

- "Bel-Air News About a Second Atmosphere" by Mathieu Lehanneur and David Edwards**:** Drawing on experimental observations of NASA scientists, Mathieu Lehanneur and David Edwards have created a new form of air filter which passes dirty air past absorptive surfaces of plants, thereby improving the capacity of plants to absorb noxious gases and particles, and, in a sense, render plants "more intelligent." Bel-Air is conceived for domestic use, a kind of living filter that absorbs and metabolizes noxious chemicals and particles from the air that circulates in our homes. Bel-Air is designed to integrate various plants with natural absorptive properties, such as spider plants. The final design optimizes the filtration capacity of leaves, roots, soil and plant water to achieve a first Laboratoire artscience innovation.

- The "Attention" program with James Nachwey and for associate scientists**:** Attention ! is a six-week experimental program of artscience collaboration aimed to catalyze innovative thinking around drug and vaccine development for the three infectious diseases – HIV-AIDS, Malaria, and Tuberculosis – that now account for more than 7,000,000 deaths per year. The experiment, intends to test the hypothesis that innovative progress can be made toward averting the present infectious disease crisis by collaboration between leading artists - James Nachtewey and Asa Mader - and scientists – Anne Goldfeld, Edward Anthony Nardell, Peter Singer and Abdallah S.Daar.

- "In Thierry Marx's Sphere" by Thierry Marx and Jérôme Bibette**:** To enter "In Thierry Marx's Sphere" is to pass the border of gastronomical mysteries and to experience new pleasures, both culinary and visual. This exhibition aims to reinvent the spirit of the chef's table in applying Jérôme Bibette's latest advances in the science of microparticles. How can one create spheres whose membranes are as thin as a soap bubble – spheres which, when they burst in one's mouth, reveal the entire and unique flavour of a food or a dish ? From this collaboration in art-science, Thierry Marx and Jérôme Bibette have given birth to new sensations brought together in the three recipes created for the exhibition.

In 2008/2009, Le Laboratoire will present experiences from Ryoji Ikeda, Shilpa Gupta, François Roche, Hussein Chalayan.

In summer 2008 Le Laboratoire will hold its first **educational program**. Through student-led initiatives that involve international student collaborations, the program aims to develop new innovative technologies with applications in global health and culture. In late August students from Trinity College (Dublin), Strate Collège (Paris) and Harvard (Massachusetts) will meet at Le Laboratoire for a two weeks workshop.

Short profile of the staff members/key experts:

Caroline Naphegyi, artistic curator at Le Laboratoire studied in Ecole du Louvre 3 years of history, one year of musicology and Master's degree on Denis Opeiheim University Paris 1 Sorbonne: and DEA in Art history: (thesis: the photography of the Invisible). Her major areas of expertise are Programming, coordination, production follow-up, prospection, follow-up with artists and partners, supervising technical, production and communication teams.

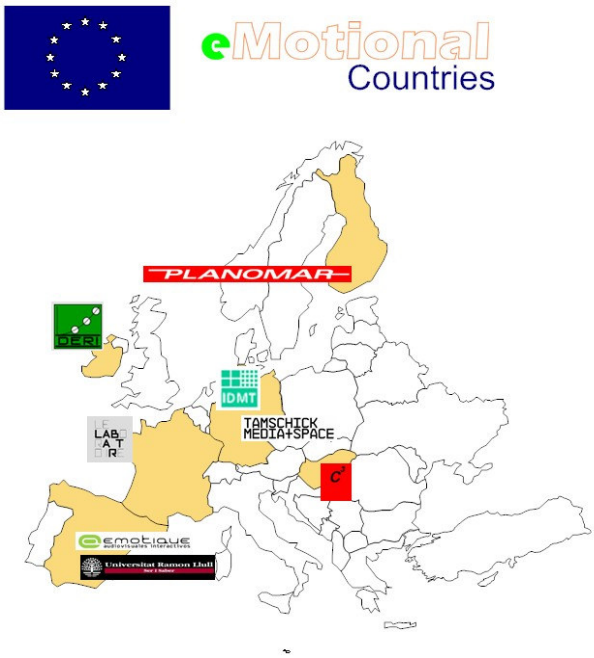
Before entering Le Laboratoire Caroline has experience in:

***Lille 3000* :** Visual Art Programming and Curator for the following exhibitions:
« Bombay Maximum City » - « les Modernités Recyclées » (recycled modernities) - « The Third Eye » and Artist's Residences and exhibitions in « les Maisons Folies » (converted factories/workshops)

***Lille 2004*,** European Culture Capital, being in charge of projects linked with living art, including: - « Metamorphoses » : Patrick Join's pink train station - « les microfolies/micro architecture : Serge Lutens' olphatory labyrinth, François Azambourg's « dinette » (small dining room in a caravane) – Walter van Belrendonck's « dream cube » - Vincent Dupont Rougier's « Natural Cage » - « Parallel worlds » : New York, Montréal, Shangai, Gand, Gênes, Le Design, Emergent designers
- Exhibitions : Droog Design's « Droog Event » (projects, exhibition, catalogue) – « From Lille with Love » (prototypes made in parternship with the Nord-Pas-de-Calais region's – Industry leaders
- Georges Pascal Ricordeau's « Ebola » - Van Lieshout's studio's « la vie est belle » (life is beautiful) – B architecten's « B-Expo »

***Mission 2000 in France* :** inter-ministry association for the celebration of year 2000.
In charge of following programs linked to the Living Art project : interface with cultural partners, follow-up of conventions and communication - exhibition curator « Mission 2000 » : « Passion Froide (cold passion) : exhibition on Chess and « Go » games Ecole Nationale des Beaux Arts de Paris : « « Implicite Connexions » (co-curator) Heartless : private association for helping young creation – « Dessin De Dessins » (play on word = drawing of projects) – illustrations research, catalogue Centre George Pompidou : 2 exhibitions catalogues : «Hors Limites » (outside boudaries) and « C'est à Vous M. Gaziorosky » (it's your turn, M. G)

B.2.3 Consortium as a whole



The eMotional consortium is formed by 8 companies from 6 European countries. The eMotional Environment is conceptually conceived to create, integrate and develop new Multimedia Technologies 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, as 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.

- **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 eMotional environment in Spanish Multimedia Development companies.

- Despite the **Fraunhofer Institute for Digital Media Technology IDMT** is quite recent (founded in 2004) the institute has developed one 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 (among others) Authoring Systems and Multimedia Semantics (both observed in specific work packages). This experience is mandatory to lead the project to a successful ending.

- **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 in their media laboratory.

- **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.

- **DERI**, as the most internationally reknown R&TD institution in Semantic Web, will provide the consortium with the knowledge required for the design and development of the collaborative eMotional platform.

- **PlanoMar**, will provide the latest screen technology for commercial demonstration of the eMotional Environment.

- **Le Laboratoire** is the only organisation in Europe committed to the cross-over of Science, Tecchnology and Arts. It will provide eMotional with a unique knowledge, space and personnel to explore the possibilities of the tool.

Subcontracting:

The tasks that cannot be performed by the partners will be subcontracted. The eMotional 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 **2.775.938,06**€ with a requested EC contribution of **2.060.247,54**€.

	EMOTIQUE	Fraunhofer	C3	DERI	MEDIA+SPACE	URL	PLANOMAR	LeLab
RTD (75%)								
Person-Months	46,0	61,0	17,0	29,0	17,0	23,5	9,5	10,5
Labour Cost	303.600,00	256.932,00	37.400,00	188.500,00	199.466,67	120.633,33	62.700,00	50.820,00
Travel & Subsist.	3.000,00	6.000,00	1.500,00	1.500,00	3.000,00	1.500,00	1.500,00	1.500,00
Materials	3.000,00	1.000,00	1.500,00	1.500,00	1.500,00	1.500,00	1.500,00	1.500,00
Equipment	0,00	2.000,00	0,00	1.000,00	0,00	0,00	0,00	0,00
Services	10.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Overheads	182.160,00	375.454,73	22.440,00	113.100,00	119.680,00	72.380,00	37.620,00	30.492,00
Total Cost	501.760,00	641.386,73	62.840,00	305.600,00	323.646,67	196.013,33	103.320,00	84.312,00
Funding	376.320,00	481.040,05	47.130,00	229.200,00	242.735,00	147.010,00	77.490,00	63.234,00
Management (100%)								
Person-Months	9,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0
Labour Cost	59.400,00	4.212,00	2.200,00	6.500,00	11.733,33	5.133,33	6.600,00	4.840,00
Travel & Subsist.	6.000,00	6.000,00	4.500,00	4.500,00	4.500,00	4.500,00	4.500,00	4.500,00
Materials	3.000,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Equipment	0,00	0,00	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	0,00	3.000,00	3.000,00
Overheads	35.640,00	6.155,00	1.320,00	3.900,00	7.040,00	3.080,00	3.960,00	2.904,00
Total Cost	114.040,00	19.867,00	11.020,00	17.900,00	26.273,33	12.713,33	18.060,00	15.244,00
Funding	114.040,00	19.867,00	11.020,00	17.900,00	26.273,33	12.713,33	18.060,00	15.244,00
Dem (50%)								
Person-Months	4,0	1,0	9,0	1,0	4,0	1,0	4,0	7,0
Labour Cost	26.400,00	4.212,00	19.800,00	6.500,00	46.933,33	5.133,33	26.400,00	33.880,00
Travel & Subsist.	3.000,00	6.000,00	6.000,00	1.500,00	3.000,00	0,00	0,00	0,00
Materials	3.000,00	0,00	3.000,00	0,00	3.000,00	0,00	0,00	0,00
Equipment	0,00	0,00	0,00	0,00	0,00	0,00	0,00	0,00
Services	10.000,00	0,00	3.000,00	0,00	6.000,00	0,00	0,00	0,00
Overheads	15.840,00	6.155,00	11.880,00	3.900,00	28.160,00	3.080,00	15.840,00	20.328,00
Total Cost	58.240,00	16.367,00	43.680,00	11.900,00	87.093,33	8.213,33	42.240,00	54.208,00
Funding	29.120,00	8.183,50	21.840,00	5.950,00	43.546,67	4.106,67	21.120,00	27.104,00

TOTAL PM	**260,5**
TOTAL Budget	**2.775.938,06**
TOTAL Funding	**2.060.247,54**

B.2.5 Mobilisation and adequacy of resources

The eMotional project partners plan to mobilise an amount of 242 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 eMotional 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	59	623.040,00	51.000	674.040,00	519.480,00
FRAUNHOFER	RC	63	653.120,72	22.500	677.620,72	509.090,54
C3	FR	27	95.040,00	22.500	117.540,00	79.990,00
DERI	FR	31	322.400,00	12.000	335.400,00	253.050,00
MEDIA+SPACE	FR	22	413.013,33	24.000	437.013,33	312.555,00
URL	FR	25,5	209.440,00	7.500	216.940,00	163.830,00
PLA	FR	14,5	153.120,00	10.500	163.620,00	116.670,00
LeLab	FR	18,5	143.264,00	10.500	153.764,00	105.582,00
Total:		**260,5**	**2.612.438,06**	**160.500**	**2.775.938,06**	**2.060.247,54**

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	78.000
Consumables (Materials and Equipment)	25.000
Subcontracting (incl. Audits)	57.500
Total:	**160.500**

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):

- for the demonstration activities
- 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;
- 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 eMotional 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	2.218.878,7	**82**
Management	235.117,7	**8**
Demonstration	321.941,7	**10**
Total eMotional Budget	**2.775.938,06**	

Table 2.4-3 eMotional Type of Activity

The **Budget is also planned and distributed according to the types of activities**. The eMotional project partners are planning **82% of its budget for RTD activities.** This RTD budget includes budget for materials and services. **8% of overall budget is planned for consortium management activities** (i.e. 7% of the Community contribution), 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 eMotional 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, **10% 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 eMotional 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

B.3 Impact

B.3.1 Expected impacts listed in the work programme

The ***Objective ICT-2007.4.2 (ICT-2007.4.4): Intelligent Content and Semantics*** claims for *"Advanced **authoring** environments for the creation of **novel forms** of interactive and expressive content enabling multimodal experimentation and non-linear story-telling"*. The eMotional Environment will allow creating new contents integrated in different technologies. These contents may be interactive by means of devices or the human body, may be immersive or traditional, 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. Nowadays developing such type of products means several thousands of code lines and requires expert staff. The language provided in the eMotional environment will let un-experienced creators fast develop such type of systems significantly reducing the time-to-market.

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)*

eMotional proposal involves a **multidisciplinary effort** requiring cooperation of people from different backgrounds required for developing future multimedia information systems, with their own specific competencies , methodologies and views of the world. By this eMotional 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.

On the end user side, multimedia systems that eMotional Environment 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 eMotional will provide creators with a powerful tool capable of communicating, strategizing, visualizing and planning such solutions. Content and installation

designers for shopping malls, leisure parks and even small shops are the main target customers of the eMotional 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 created by means of the eMotional Environment.

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 eMotional Environment.

On the citizens side, eMotional 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) enabling non expert users to acquire, manage and share content iin different media.

The objective ***ICT-2007.4.2 (ICT-2007.4.4)*** also underlines that *"these environments will ease content sharing and remixing, also by non-expert users, by automatically tagging content with semantic metadata and by using open standards to store it in networked repositories supporting symbolic and similarity-based indexing and search capabilities, for all content types."* 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 by means of fast searches of contents world-wide. 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. Furthermore combining both the creative capacity of the environment and its storage & search capabilities we'll obtain an *effective technology for intelligent content creation and management, and for supporting the capture of knowledge and its sharing and reuse.*

eMotional also pursues the challenge defined by the work programme *"to harness the synergies made possible by linking content, knowledge and learning; to make content and knowledge abundant, accessible, interactive and usable over time by humans and machines alike. This should take into account current trends in content production and consumption and particularly the move from few-to-many to many to- many models. Europe, with its unique cultural heritage and creative potential, is well placed to take advantage of this paradigm shift and to be a key actor in the knowledge economy".* As described in the work proposed, eMotional 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 eMotional 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 eMotional Platform which is an interesting competitive factor before the existing environments in the market.

Apart from delivering a completely new concept in the authoring tools market, the work carried out under eMotional will contribute to the implementation of the "i2010: Digital Libraries" initiative.

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.

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.3.2 Dissemination, results exploitation, and management of intellectual property

B.3.2.1 Dissemination activities

The EMotional 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 eMotional 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 eMotional 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 eMotional 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 eMotional participants will undertake according to target audience.

Events relevant to eMotional topics, where the consortium representatives may present and disseminate eMotional 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 EMotional 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 EMotional 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 Dissemination 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.3.2.2 Exploitation of project results

The EMotional staged approach

All dissemination and exploitation efforts and materials, as well as their viability, integrity, complementarity and consistency, will be supervised in WP9. eMotional 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 eMotional 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 three 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 eMotional 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.3.2.3 Overall exploitation plan

Product focus:

The eMotional 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 eMotional 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 eMotional 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 eMotional 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 eMotional 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, eMotional 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.3.2.4 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 eMotional 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	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.
4	DERI	**IE**	Leading research institutions in Semantic Web and Semantic Web services from Europe and abroad.	**CR**	* **Reference markets:** R&D Community, Tecchnology Transfer to companies * **Business models:** To provide local and international creators with leading-edge technology for their creations. Obtain international presence in the art&technology scene. DERI will ensure that the project remains highly visible – particularly regarding its key achievements, and identify potential application areas and market

No	Partner	Ctry	Competence	Role	Interest in the project / Exploitation route
					opportunities. We also recognize the importance of standardization to encourage industrial uptake. DERI is involved in standardization activities in W3C and OASIS and we aim to analyze and monitor existing and emerging standards that are relevant to this project as well as to propose extensions or enhancements of established standards to support eMotional.
5	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.
6	URL	**SP**	Educating 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 eMotional technology integrators, offer of services to end-users.
7	PLA	**FI**	Design and Development of screen resistant for ambient light (PlanoScreen)	**CR**	* **Reference markets:** events organizers, big commercial brands, big surfaces (stadiums, hypermarkets, etc), academia, etc * **Business models:** license agreement integrating eMotional technology as a competitive advantage before the American and Asian markets.

B.3.2.5 Management of knowledge and intellectual property

For every partner of the eMotional 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, eMotional partners have drafted a Consortium Agreement, including IPR Issues, to support common and individual dissemination and exploitation strategies. A eMotional Exploitation Agreement will be developed taking into account the following preliminary agreements:

- Concerning exploitation of the project results, it is the understanding of the eMotional 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* eMotional. 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 eMotional.

B.4 Ethical Issues

EMotional 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 eMotional 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. ***eMotional*** 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, eMotional 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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[TOUCH] Derivative Inc., "Touch", http://www.derivativeinc.com

[MAX/MSP] Cycling '74, "Max/MSP", http://www.cycling74.com

[VVVV] Meso, "VVVV", http://vvvv.meso.net

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[ALICE] Carnegie Mellon's "Alice", http://www.alice.org/

[CODE] Dr. James C. Browne, Dwip Banerjee and Emery Berger, "CODE" in http://www.cs.utexas.edu/users/code/

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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
Prot	Prototype
R	Report (in Nature), Restricted (in Diss. Level)
RTD	Research and Technological Development
S&T	Scientific & Technological
SME	Small and Medium Enterprise
STREP	Small or medium-scale focused research project
Sw	Software
WP	Workpackage