Specific targeted research project

IST call 5

FP6-2005-IST-5

European Meme and Memory Agent

[EMMA]

Date of preparation: 21.09.2005

Version number (optional): 3.3

Participant no.	Participant name	Participant org. short name
1 (coordinator)	Salzburg Research Forschungsgesellschaft m.b.H (AT)	SRFG
2	Centrum voor Wiskunde en Informatica (NL)	CWI
3	Consiglio Nazionale delle Ricerche (IT)	ISTC-CNR
4	The Open University (UK)	KMI
5	University of Twente (NL)	UT
6	PRC Group – The Management House (GR)	PRC Group
7	Taideteollinen korkeakoulu (University of Art and Design) Media Lab (FI)	TaiK
8	Tel Aviv University (IL)	TAU
9	Helsinki University of Technology (FI)	TKK
10	Intersoft, a.s. (SK)	IS
11	The Interactive Institute AB (SE)	TII

Name of the coordinating person: John Pereira

e-mail: john.pereira@salzburgresearch.at

fax: 0043-662-2288-222

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Proposal abstract

EMMA (European Memory and Meme Agent) will create novel software components with which Memory Institutions will be able to engage the public in a rich discourse about culture and collective memory. EMMA will extend the traditional portal-style access to distributed Cultural Heritage (CH) sources by a facility for the public to add private media collections to collective memory, to add knowledge to such collections through semantic social software, and to create engaging media presentations based on semantically guided narratives . There will be a circulating flow of information, in which the public can take the role of consumer as well as content producer.

The technical innovation of EMMA lies in combining knowledge and media management, multimedia knowledge presentation and semantically enabled social software in order to arrive at a two-way multimedia information systems, in which e-communities engage in discourse far beyond the capabilities of current web technology The major specific innovation is the idea of formalising memes to arrive at a knowledge representation of ideas and beliefs.

The project can be anthropomorphised as consisting of four agents: the communaliser, the contextualiser, the narratiser and the memetiser. Through these, content and knowledge can be encoded, enhanced by other knowledge and data, expressed using story lines for different purposes, and ultimately be made an integral part of a new cultural discourse. Giving a formal definition to the notion of memes promises to open new avenues for CH in and outside the memory institutions. The consortium brings in knowledge from other projects as well as from national programmes and is therefore uniquely positioned to meet EMMA's RTD challenge.

B.1 Scientific and technological objectives of the project and state of the art

EMMA tackles the overall question of how one can facilitate the use of digital cultural information. It does so by addressing the technological aspects of four interdependent sub-problems of cultural heritage: firstly, the problem of participation of the individual, in CH activities. Secondly, the building up of knowledge *around* and *between* digital representations of cultural artefacts. Thirdly, the presentation of such digital knowledge spaces in time-based hypermedia and fourthly, the process of engaging diverse groups of citizens into a rich and fruitful cultural discourse - in an expanding European Union - by improving social software so that it can become the medium for the envisioned rich cultural spaces. Scientifically and technologically, this entails an investigation of the four major questions:

1. What kinds of culturally relevant e-communities would people like to join and what kinds of interfaces and tools as well as actual content would be needed to make people participate in activities of cultural heritage?

2. How can complex cultural objects which have been digitised and enriched by knowledge annotations and metadata, be managed? The aim is to study the complexity of human artefacts, their relationships to other elements of knowledge, and to arrive at multi-faceted semantic models. The expected results will be based on existing work and will further European technology in the field of knowledge technologies, with its application validated in a rich CH usage scenario.

3. How can these complex objects be contextualised and rendered in an intelligent knowledge-and-media presentation environment? Given a knowledge structure, the components developed by EMMA will interpret the structure with respect to a model of narratives and their dramatic elements, as well as stylistic elements that give certain genres their "look and feel". The aim is to dynamically contextualise CH content through knowledge gathered from different sources, and to enhance the use of non-textual communication through multimedia interfaces that are created using semiotic analysis and guidelines[1].

4. How can the contextualised and rendered knowledge and content objects be introduced into a community of interest so that its members can perceive the newly created content, can interact with it, and can enter into a semantically enabled discourse which results in further enrichment of the cultural content? This element has - in our view - been missing in much of the technology research in recent years (or was studied in isolation). The core innovation of EMMA lies in showing how knowledge and media *management*, multimedia knowledge *presentation* and semantically enabled *social software* can become the fundamental ingredients of advanced, two-way multimedia information systems, in which e-communities engage in discourse that goes far beyond the capabilities of current web technology.

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[1] Semiotics: "the study of the sign-systems by which meaningful communication or literary discourse occurs. As understood by semiotics, in a linguistic event a set of conventions (langue) is used to express a particular meaning (parole). The linguistic event in turn has meaning to a receiver able to apply a set of conventions to its signs. The operations by which a reader/receiver interprets signs and makes them meaningful is termed naturalization." www2.cumberlandcollege.edu/acad/english/litcritweb/glossary.htm

We have distilled these top four questions from our "project architecture" which has proven a useful means of focusing on the research elements which we believe need to be addressed. The following diagram schematises the research challenge.

1. *Communaliser* - the set of tools and functions which allow users access to cultural resources and which allow them to also act as providers of content. This includes e.g. user agents and the CH data bases.
2. *Contextualiser* - a set of functions which take either some new resources or the result of a query as input, and combine that input with semantically related resources.
3. *Narratiser* - a set of tools and functions which are needed to create either a fully sequential narrative from the contextualised knowledge and content object, or create a set of partial sequences which are ordered as a semantically coherent hypertext object.
4. *Memetiser* - a set of tools and functions to combine the knowledge and content objects created in the narratiser, with semantically enhanced representations of discourse about the content.
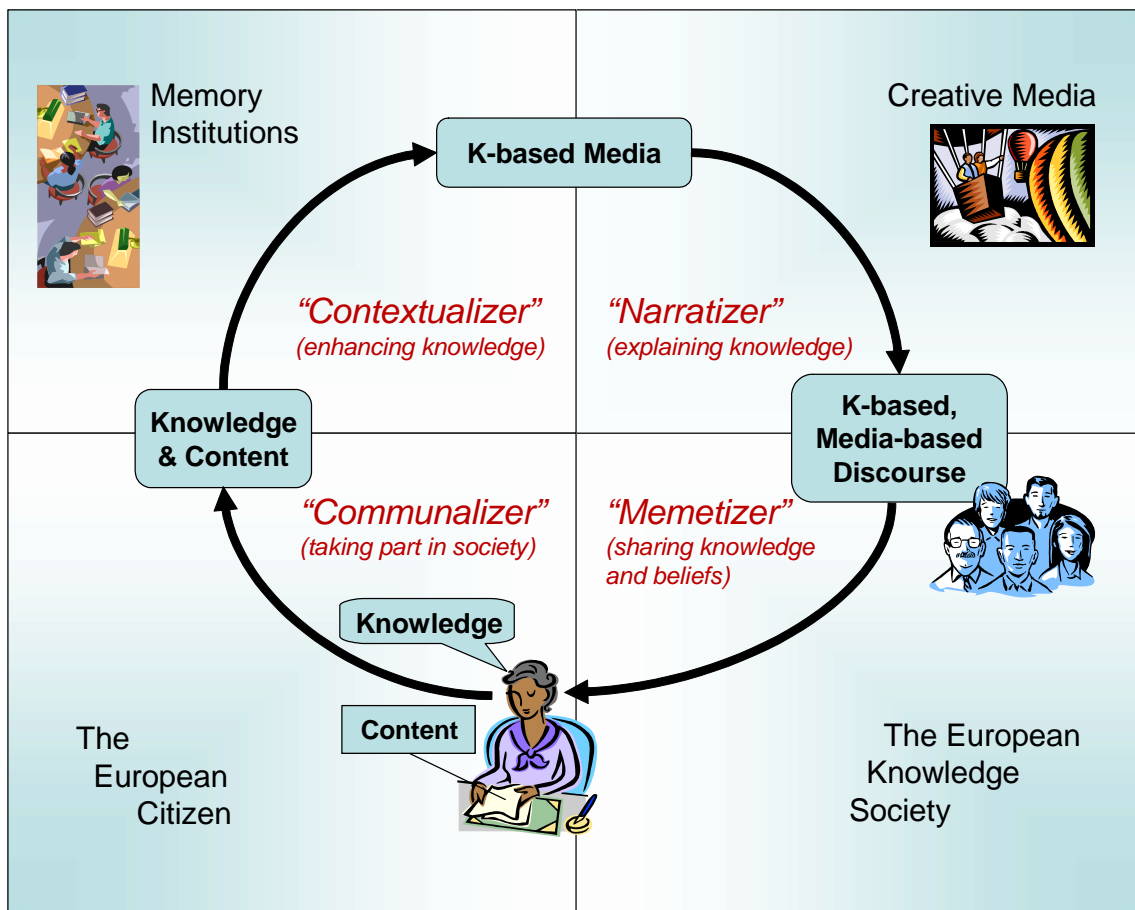
The following example gives the reader a notion of how a system that combines the above four technological elements, could be used.

Example: "Daisy Melange" Tableware

Currently, the Imperial Furniture Collection in the context of www.oesterreich2005.at (60 Years II. Republic - 50 Years Austrian State Treaty - 10 Years EU-Membership) exhibits around 350 products from the Lilien-Porzellan factory. Of these products, particularly the "Daisy Melange" series form part of Austria's material and "lived" cultural heritage.

Historical background: Kurt Lichtenstern, owner of a ceramics factory in Wilhelmsburg/Lower Austria was expropriated by the National Socialist regime and forced to emigrate. He returned from exile in the USA after the war and redeveloped his business. In 1957 he began to produce porcelaine under the brand name "Lilien-Porzellan", made known by so far unusual "American" marketing methods. The "Daisy Melange" service was the most successful product of the business. Today, Daisy pieces are cult objects and sought-after collectors' items.

Image from:
www.lokalfuehrer.at/?site=
themen&id=10)
Overview of "Daisy" products,
http://www.lilienporzellan.com/

daisy/

What EMMA could do with "Daisy Melange":

Powered by EMMA technology, interested individuals could upload images, personal stories, and annotations related to "Daisy" items from their households (see image). For example, a (short) personal story could be: "Around 1960 we bought a coffee set called Daisy from Lilien Porcelaine. Also other families had this set at home. I still own some piece that I cherish very much. Last year I bought some additional pieces at a flea market in Vienna. Pieces such as a coffee cup are also sold at eBay for about 20 Euro."

The EMMA system would use the meme *Family life → tableware → Daisy → 1960* (derived from the annotations) for retrieving related memes and heritage resources, and generate a knowledge-based hypermedia story. The initiator of the story and other interested people could then use the EMMA social software for an online conversation that extends the story. The discourse thread that is extracted from this conversation can be combined with memes and information threads from curators and historians. They would contextualise "Daisy" not only in family life, but would also provide historical background information. For example, such threads could be based on meta- or context-memes such as *Economic history → advertising → tableware* or *NS regime → expropriation → factories → ceramics*.

The EMMA Approach

(Description based on the Diagram on page 9)

We envisage to use semantic web technology in order to describe <u>memes</u>, i.e. complex knowledge about historic events, political and cultural themes, which seem relatively fixed and yet, have significant culture-dependent variations and views.

In order to be compatible with the aims of ambient intelligence, we see users represented by agent-like software processes which are capable of some autonomy, always within user-defined boundaries. The <u>user agents</u> take part in communicative transactions as representatives of their owners, in negotiations with <u>discourse managers</u> who can either be humans or software processes.

<u>Discourse</u> happens when <u>content</u> is combined with a <u>script</u> / narrative structure and when users and/or their agents communicate with each other about the "story" i.e. the content and its <u>narrative</u>. This entails on the one hand, the existence of <u>interactive</u>, "script-aware" <u>multimedia</u> <u>presentation</u> environments, and on the other hand, some "<u>stage</u>" which supports

the social interaction between the participants of the discourse. The whole machinery needs to be able to <u>manage</u> various <u>discourse</u> <u>threads</u> which are evolving on this platform, and some of which may cross the boundaries of the thread and interleave with each other, while keeping some <u>semantically describable discourse</u> identity.

Once the envisaged <u>technology platform for semantically enabled cultural discourse</u> is in existence, it should be possible to monitor the usage of the platform and to understand the emergence of new memes, as well as the re-use of existing memes, by investigating the flow of discourse at the semantic level.

It is clearly envisaged that the proposed platform and its main components can be re-used in different (i.e. non-cultural) application scenarios and this will be the task in the latter part of the project, when the system will be *demonstrated* to SMEs with the objective of fostering commercial uptake in different sectors.

On the left, the "traditional" knowledge and media architecture with its heterogeneous information systems can be seen. On the top (left to right), the rendering of narratives from knowledge and media structures is depicted. On the right, we show how narrative artefacts enter the social platform and get further enhanced by the discourse that arises around them. The important point to note is that the artefacts get semantically enriched and are then re-introduced into the knowledge cycle, with the added capability of the system to derive memetic structures (so-called "memes") from the discourse.

[EMMA]

Story scripts manager (incl. editor)

Scripts DB

Stories DB

Scripts (genre, dramatic specs)

Multimedia Player

Multimedia Story 1   Story 2… x

Story generator/ incl. editor

···>

Story v1.1   v1.2   v1.3

User content 1.2, 1.3,…
+ discourse threads summaries/extracts

Metadata Harvesting Service (e.g. OAI-PMH)

Institut. content: 1.1

Meme-based K+C

User (collab.) editing

Semantic Social Software: Forum / Discourse 1

2   x

Content Reposi- tories

Search, Retrieval & Contextual- isation

User content 1.1

Discourse community manager (incl. protocols)

Text

<link>

Context description for content

Image

Sound

User agent

Info about:
• Existing Fora
• Users with similar interests

Discourse threads DB

Discourse thread 1   Discourse thread 2   Discourse thread x

Video

3D

Memes Manager (incl. classif- ication)

• Template for upload of content and context description

• Registration

1.2

Info about::
• Existing memes
• New memes

Memes DB

User (non-prof.), curators, multimedia producers, …

Content   Knowledge

Provide, annotate, search, content; study; edit stories,..

Individual and community activities

Discuss, add content, annotate, explain, study, teach & learn,..

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Specific RTD challenges

As with all current semantic web technologies, the challenge is to get a handle on the cognitive complexity of "flat" graph representations which contain knowledge structures at different levels of abstraction. For presentation, this means mapping directed, typed multi-graphs (graphs with more than one edge between two nodes) into layered hyper-graphs i.e. a set of graphs which are organised in one or more partial orders. This is needed because the digital cultural objects are related to each other via many knowledge-based associations and we need to further organise sub-graphs so that they appear together (e.g. on one "page" or in one "scene") and in some order (corresponding to a story-line).

Cognitively and linguistically, the challenge is to model certain types of media-supported discourse (e.g. "documentary", "biography", "socio-economic analysis"), and to generate semantically coherent media presentations of such discourse patterns, so that repositories of cultural information can be made accessible in a user-friendly fashion via telecommunications. Additionally, there is a challenge to analyse and model semiotic features of certain time periods (in fact, cultural periods) and use them correctly in the creation of a "media ambience" - e.g. the semiotics of "typical 60s swinging London".

In terms of cultural relevance the challenge is to provide novel ways of engaging potential users in web-based community experiences that involve cultural resources. We believe that there is value in developing *a resolutely modern notion* of the "edified, educated citizen" (and not only in Europe) and we believe EMMA could release a potential that is already "out there" in the form of people who "want to understand more of the world". This is the challenge we have set ourselves.

State of the Art - Analysis, Working Hypotheses and Expected Results

The following research fields are relevant for our assessment of the state of the art.

1. **Social Software** - engaging a user in *communalising* knowledge and content in virtual space

2. **CH Standards** - Describing and *contextualising* digital cultural heritage content

3. **Multimedia Narratives** - turning contextualised content and knowledge objects into time- and space-based media, giving input to the *Narratiser* component

4. **Collective Memory** - understanding the nature of "memes": ideas, beliefs, widely held views. We view this as a novel research area for formal representation of memory structures and for defining an initial *taxonomy of memes*, which will underpin the *Memetiser*.

5. **Discourse Models** - a transdisciplinary field ranging from linguistic models of discourse to computational models and to semantically described forms of discourse.

6. **Ontologies and Semantics** - making the elements of the EMMA architecture amenable to computation by the *Contextualiser*, through describing the concepts and processes via foundational ontologies where possible.

7. **Knowledge and Content Modelling** - making semantically annotated media based content shareable across system boundaries.

8. **Needs Analysis for CH Stakeholders** - investigating the needs of CH information consumers and CH information providers

The method of presentation is to briefly describe the problem and relevant work, and to close each subsection with a *working hypothesis* (boxed text) that describes how EMMA will *approach* the problem and how we will *extend the state of the art* in the relevant subfield.

1. **Social Software** - engaging a user in *communalising* knowledge and content in virtual space

From Moving Here, http://www.movinghere.org.uk.

Moving Here records the history of four ethnic communities - Caribbean, Irish, Jewish and South Asian - before and after immigrating to England; it is the biggest online collection of this kind, in March 2004 about 200,000 digitised items.[2]

Corpus of stories: In September 2005 about 500 stories (suggested max. length about 1000 words) uploaded by individuals of whom some have worked with Moving Here on community projects. A large part of the stories have images attached which are either from the story contributors themselves or are chosen by them from the Moving Here catalogue. The upload template also asks for a story title and the covering dates for the period for which the story is relevant. Contributors may also add a link, e.g. to their personal or a project Website.

The following thematic categories, used for the "Migration Histories" for the four immigrant communities written by specialists, may also characterise the story topics: Origins, Journeys, Settling, Growing Up, Working Lives, Culture and Festivals, and Politics.

The story contributors add to Moving Here core themes their viewpoints, experiences, recollections, and non-academic styles of narration, explanation and interpretation. This is seen as a unique opportunity for curators and scholars to reflect on how they document, contextualise and interpret public records and collection items.

Moving Here has no social software based community or even traditional forms of user involvement such as a bulletin board, discussion forums or chat room. Its innovative character lies solely in the participatory approach to content creation and is by no means backed up by any innovative technology.

Working hypothesis on the social software components

Much of innovation in CH is primarily (and rightly so!) concerned with the *communities* of interest and how the communities can use **existing** "advanced" technology for their purposes. We will require CH institutions who are interested in the combination of innovative use *and* innovative technology, to be part of the EMMA project.

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2. **CH Standards** - Describing and *contextualising* digital cultural heritage content

We are aware of both of the current standards in use (e.g., Dublin Core, MARC21, TEI, EAD) and models in the making (FRBR, CIDOC CRM). Our preliminary conclusion is that most of these standards deal primarily with the semantics of managing cultural artefacts, and at most what the artefacts *are,* and not with the semantics of describing what they are *about,* that is,

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2 G. Geser and H. Wood: Moving Here – Migration Records and Experiences. In: DigiCULT Thematic Issue 5, January 2004, 25-35.

their cultural content, and how these artefacts are <u>contextualised</u> in the body of human knowledge. Iconographic description languages, such as the Iconclass taxonomy, is one starting point for cultural content description, but its semantics are fixed within the conventional system of Western (or Classical) iconography, and thus will need considerable generalisation with a view to developing a specific content description language which can express *common* (rather than scholarly) knowledge on the meaning of cultural objects, which at the same time is well connected to the existing and emerging standards.

Working hypothesis of EMMA on the modelling of CH information:

We need to distinguish between modelling of the *management <u>of</u>* cultural artefacts and common or specialist *knowledge <u>about</u>* cultural artefacts. EMMA will put more emphasis on the modelling of the "aboutness" of cultural artefacts, rather than their cataloguing which is being covered e.g. by work on the CIDOC CRM. Our proposed research will take into account the work of Hunter and Lagoze, (ABC model - ontologising of MPEG-7 for CH), and work by Dörr, Hunter, Gangemi and others who explored the combination of ABC, and CIDOC on the basis of the DOLCE foundational ontology.

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3. **Multimedia Narratives** - turning content and knowledge into time- and space-based media

Story-generation systems use narrative engines to create stories and plots. The engine has to take care that appropriately well-formed narratives are generated. Engines may use AI techniques such as planning algorithms for a character's actions or discourse grammars to define well-formed stories. The narrative engine needs to deal with macro-structural issues (the whole story) as well as microstructural issues (adjusting individual fragments).

The presentation generator creates interactive multimedia presentations. In order to achieve this, [Maybury, 1993] identified[3] several problems that have to be dealt with. One task in generating a presentation is selecting its content. In EMMA, the result of *content planning* will be a collection of discourse units. The content may be extracted from existing documents or generated from abstract structures. The appropriate basis for generation in our case has to be investigated. Ideally, one would hope to be able to reuse as much material of existing data as possible.

Another task, *technique selection,* aims at selecting the best modality to convey the presentation content. In our case, this may involve presenting material through written text or via audio, for instance. An important related aspect to consider is the way the information is presented. *Presentation design* deals with the question how media and modalities will be used to communicate their selected information content. The presentation is only comprehensible if its elements are properly ordered spatially and temporally and appropriately connected. This may involve such operations as changing the phrasing in the case of text, montage in the case of film[4], lay-out of text combining images and text and many other aspects of the generation of multimedia texts. The task of *coordination* deals with the ordering of presentation elements, but also with adapting content to their context. Elements may have to be adapted to resolve conflicts and maintain presentation consistency.

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3 [André, 2000] provides a more extensive overview of the issues.

4 [Zancanaro, Stock, Alfaro, 2003] discuss an interesting example of this.

Working hypothesis on story telling and discourse - Grice's conversational maxims

An important set of measures for judging the quality of the complete set of presentations generated during a discourse, can be derived from Grice's conversational maxims [Grice[5], 1975]. A few paraphrases of these maxims, adapted to our case, could be the following.

- Maxim of *quantity*: provide the visitor with the information he wants to hear and nothing more; do not repeat yourself, make the appropriate references to previous presentation fragments etc.;
- Maxim of *quality*: give reliable information;
- Maxim of *relevance*: make the presentation relevant to what the visitor is attending to, make your contributions relevant with respect to each other, make them cohere);
- Maxim of *manner*: choose the appropriate modality, find the right kinds of illustrations with the text, use a clear lay-out, do not burden the visitor with too much information, know what you have said before, make sure that the visitor is able and knows how to respond to the prompts, etc.

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4. **Collective Memory** - understanding the nature of ideas, beliefs, and widely held views.

We subsume here several lines of research concerned with the study of collective memories either in the form of stories or as some semi-formal information structure, e.g. "memes", "intertextual threads", or similar. Memes regained popularity by Susan Blackmore's article in Scientific American[6]. The intuition is that memes behave similar to genes (propagation, mutation, etc.) and that this leads to the evolution of beneficial patterns of thought and behaviour. A recent article by Edmonds[7] casts doubt on the achievements of the field of memetics.

Working hypothesis of EMMA on the modelling of collective memory structures (memes):

Our analysis of existing approaches points to a lack of semi-formal and formal models which could make items of collective memory manageable as "thought patterns". We propose a domain analysis of current meme-models, aiming at a formal model which synthesises the major elements of current theories of cultural memory. The expected output is an *initial* taxonomy of European socio-cultural memes, with *specialisations in selected parts* to explore the potential of the taxonomy.

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5. **Discourse Models** - from linguistic to computational models of discourse.

Semantics-based support, capturing and processing of online collaboration in the form of conversation about objects, events or situations is almost non-existent. Communities of

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[5] Grice H. P. (1975) Logic and Conversation, in P. Cole & J. L. Morgan (Eds.) Syntax and Semantics, vol. 3: Speech-Acts, New York: Academic Press, 41-58.

[6] Blackmore,S.J. 2000 The power of memes. *Scientific American,* **283:4,** 52-61.

7 Edmonds, B. (2005). The revealed poverty of the gene-meme analogy – why memetics per se has failed to produce substantive results.Journal of Memetics - Evolutionary Models of Information Transmission, 9. http://jom-emit.cfpm.org/2005/vol9/edmonds_b.html

practice or interest express, and often conceptualise for the first time, their common knowledge in conversations, yet, due to a lack in explicit semantics the knowledge remains 'embedded' in mailing lists or online forums. This is particularly evident with respect to social software based communities. They have seen a tremendous growth, however, little has been achieved so far to enable processing and re-use of the knowledge Wikis or Weblogs contain.[8] Understandably, first attempts to capture "shared conceptualisations" and "knowledge flows" (Anjewierden et al. 2004) start by representing linkage structures and common terms.[9]

Working hypothesis on semantic social software communities

We understand that semantic social software of an increasing degree of sophistication may well be developed in the current R&D efforts. Yet, little will be achieved with respect to a broad uptake and use if communities of practice and discourse (academic/professional as well as non-professional) cannot clearly observe a good ratio between additional efforts required in 'semanticising' their collaboration and the benefits that may be gained in rather short term. Hence, beside the technological challenges of semantic social software based collaboration, there are research issues regarding an ethnology (roles, practices, values, preferences within online communities) as well as an micro economy of the 'semantisation'.

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6. **Ontologies and Semantics** - making EMMA amenable to computation

EMMA poses two types of issues concerning the ontological representation of the semantics underlying the envisioned knowledge system. Firstly, which and how many ontologies will be needed for supporting the reasoning tasks required by three of the project's four main components (namely, the communaliser, the contextualiser, the narratizer)? A first schematic answer to this question is provided by the following list:

Ontology of Cultural Heritage. A lot of work is being done on this theme, and not surprisingly given the potential of the market of the digitalization of cultural heritage. For instance, already in 2002 the ISO/CD 21127 standard was proposed[10], which provided a hierarchical structure for concepts. Other examples are CHIOS[11], AAT[12] and many others, which all need to be further studied, in isolation and in interaction with one another in order to use them as basis or simple sources of inspiration when engineering the knowledge blocks for the contextualiser.

Ontology of Narratives. Even though some work has been done on the theme, this research field does not look as developed as the one above. Narratology may provide sources of inspiration to EMMA's ontological effort, but limited ready-for-use formalization. Promising starting points are works like [Kilfeather, McAuley, McHugh Corns. An ontological application for archaeological narratives. In Proceedings of 14th International Workshop on

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8 Some first demonstrators that try to combine Wikis and Weblogs with RDF based mechanisms include Wiksar (http://wiki.navigable.info); Playtypus Wiki (http://platypuswiki.sourceforge.net); and a semantic blogging project sponsored by Hewlett Packard (www.semanticblogging.org).

9 cf. the BlogTrace software (which uses RDF, OWL) created by Anjewierden, A. et al: "Detecting knowledge flows in weblogs". Common Semantics for Sharing Knowledge: Contributions to ICCS 2005. http://staff.science.uva.nl/~anjo/kflows_iccs2005.pdf;

10 http://www.niso.org/international/SC4/n500.pdf

11 http://www.dl-forum.de/deutsch/projekte/projekte_476_DEU_HTML.htm

12 http://www.getty.edu/research/conducting_research/vocabularies/aat/about.html

Database and Expert Systems Applications (DEXA'03)   p. 110], or [Geurts, Bocconi, van Ossenbruggen, Hardman. Towards Ontology-driven Discourse: From Semantic Graphs to Multimedia Presentations[13]]

Ontology of Discourse. The most comprehensive starting point on discourse representation certainly is the Segmented Discourse Representation Theory, proposed by Asher and Lascarides 2003. Moreover, interesting work already exists in the direction of ontology-based discourse, see for instance like [Geurts, Bocconi, van Ossenbruggen, Hardman. Towards Ontology-driven Discourse: From Semantic Graphs to Multimedia Presentations]

Ontology of Social Reality. This is a hot topic in Formal Ontology and many efforts are being done in this direction [Smith, Searle[14]] or [Boella, van der Torre[15]].   This area has not produced stable results yet, but there are various significant attempts of producing a general ontology of social reality. Such attempts will certainly provide valuable guidelines in modeling key knowledge for EMMA's communalizer and the contextualiser.

Secondly, and once the above list is complete, the issue is how to relate the above ontologies in one unifying ontology? This problem is probably best tackled in terms how to define the knowledge blocks for EMMA's fourth component (namely, the memetiser).

Working hypothesis on ontologies in EMMA

There are several specific domain ontologies that need to be integrated in order for the EMMA system to obtain a coherent reasoning engine. We will investigate to what extent the existing approaches can be re-used, and how costly the integration of the semantics will be.

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7. **Knowledge and Content Modelling** - making semantically annotated media shareable

One of the challenges of advanced web-based systems is that the web has evolved from text-based to multimedia and, recently, to semantics-based usage scenarios. It is therefore strategically important to enable a seamless future web in which text, media and any formal data structure can interoperate. The consortium brings extensive expertise in this area, e.g. enhanced multimedia meta objects (EMMOs), knowledge content objects (KCOs), and in two varieties of "Information Objects". The EMMO was a non-semantic web approach to develop semantically annotated multimedia presentations [16]. The knowledge content objects (KCOs)[17] developed in the METOKIS project are compliant with the foundational ontology of DOLCE and have full semantic web compatibility. KCOs are derived from the Information Object

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13 http://homepages.cwi.nl/~media/publications/iswc2003.pdf

14 Smith, Searle. The Construction of Social Reality: An Exchange. In American Journal of Economics and Sociology

15 Boella, van der Torre . An Agent Oriented Ontology of Social Reality in in A.C. Varzi, L. Vieu (eds.), Formal Ontology in Information Systems, Proceedings of the International Conference FOIS 2004, Torino, November 4-6, 2004, IOS Press Amsterdam, 2004

16 Schellner, K., Westermann, U., Zillner, S. and W., K., CULTOS: Towards a World-Wide Digital Collection of Exchangeable Units of Multimedia Content for Intertex-tual Studies. in Conference on Distributed Multimedia Systems (DMS 2003), (Miami, Florida, 2003).

17 Behrendt, W., Gangemi, A., Maass, W., Westenthaler, R.: Towards an Ontology-Based Distributed Ar-chitecture for Paid Content, IN: A. Gómez-Pérez and J. Euzenat (Eds.): European Semantic Web Con-ference 2005, LNCS 3532, pp. 257–271, 2005. Springer-Verlag Berlin Heidelberg 2005.

pattern developed in the Wonderweb project[18]. The KCO design was also influenced by the InformationObject defined in the INKASS project[19], particularly the business semantics facet of KCOs draws on the explorations of INKASS.

However, these recent results have not yet been used much outside the relevant research communities (except for improved products for industrial partners). The challenge in EMMA would be to show that the complexity of mixed digital media and content management together with support for discourse communities, is well addressed by these models (or, that we need revisions to the models).

Working hypothesis of EMMA on the modelling of knowledge and content

CNR and Salzburg Research have been involved in projects which developed generic models for the management of content and knowledge as part of their research agenda[20]. The KCO model developed in METOKIS is the latest such model and has addressed a number of the challenges posed by the semantic web to content modelling. In EMMA, we shall make use of the METOKIS model and system architecture and specialise it to the needs of cultural heritage information management, presentation of complex media artefacts, and to usage in social software environments. The representation of community interaction with complex media objects is likely to be a central part of the investigation. Another challenge will be to streamline the internal representations used in current research prototypes so as to prove seamless knowledge based interoperation across the EMMA architecture.

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8. **Needs Analysis for CH Stakeholders** - investigating CH needs for tools

Existing technological research in the field of cultural heritage ICT has focussed almost primarily on institutional needs, and 'canonical', authoritative institutional viewpoints about cultural heritage objects. In the meantime, trends in the field of cultural heritage interpretation, museum and cultural studies, have been in the direction of moving from objects to object histories – the stories that objects can "tell" about people, places and cultures – and the production of meaning is increasingly seen as linked with the process of cultural reception by actual "interpretive communities". The act of cultural communication, for instance people's experience of cultural objects, is seen as constitutive of the meaning of these objects. Likewise, the process of learning about cultural heritage and the past is seen as a constructive process, rather than a technology-enabled transfer of information from a cultural institution to virtual visitors.

At the same time, it is understood that different communities of interest project different meaning structures on cultural objects, on the basis of cultural predispositions and interests. It is, therefore, accepted, that user behaviour and user experience is patterned, and that an enjoyable and fulfilling experience depends greatly on understanding and modelling the needs of different publics in the interfaces and business logic of experiences presented for public use.

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18 Gangemi A, Guarino N, Masolo C, Oltramari A, Schneider L, "Sweetening Ontologies with DOLCE", in Benjamins et al. (eds.), Proceedings of the 13th European Conference on Knowledge Engineering and Knowledge Management (EKAW2002), Sigüenza, Spain, 2002

19 Abecker, A., Apostolou, D., Maass, W., Mentzas, G., Reuschling, C. and Tabor, S., Towards an Information Ontology for Knowledge Asset Trading. in ICE 2003 - 9th International Conference of Concurrent Enterprising, (Espoo, Finland, 2003).

20 Gangemi, A., Borgo, S., Catenacci, C. and Lehmann, J. Task Taxonomies for Knowledge Content, METOKIS Deliverable, D07, 2004.

> **Working hypothesis on requirements capture and modelling of users and user groups**:
>
> Target group segmentation approaches, as combined with information requirements analysis methods by PRC in the innovative Critical Publics Analysis technique, will be combined with ethnographic observation-based methods in order to identify different 'interpretive communities' as well as formally model their relationship with different meaning structures (e.g., narratives, pictorial compositions etc.) and styles/genres of experience.

With EMMA, we plan to demonstrate that:

- the description and representation of any digital cultural artefacts can be achieved through a combination of Knowledge Content Objects, a semantics based CH management standard, and the contextualisation which will be brought about by EMMA's cultural content description language;

- the above objects can also represent memes and that contextualisations (e.g. intertextual threads, cf. www.cultos.org) are special kinds of memes, i.e. that KCOs have the representational power to express arbitrary memes and can thus, become carrier structures for memes across human and machine boundaries;

- our narrative model can generate multimedia representations that obey certain rules of genre and discourse

- our platform of social software integrates interactive storytelling technology meaningfully, with specific types of collaboration some of which may be led by software "agents";

- by capturing user requirements in the CH sector (technology pull) and combining them with our novel ideas for "advanced knowledge and creativity tools" (technology push), we offer a radically new technology to CH as well as other media, knowledge and collaboration- intensive sectors;

- by developing an open source system and demonstrating it to interested parties over a six-month period at the end of the project, we make a substantial contribution to the maturing of the results in a resource-protecting manner while maximising the chances of uptake outside the consortium.

> **Summary of Research Challenges posed by EMMA:**
>
> 1. Adequately represent the complexity of cultural information objects specifically focusing on the problem of partial or missing data
> 2. Address the respective complexity in potential use contexts:
>   - Different communities of use
>   - Cultural experiences revolving around story telling
>   - Structuring explanations about the past
> 3. Making digital, cultural objects easy communicate in human-machine discourse thus connecting culturally interested citizens to the Semantic Web in an unobtrusive manner
> 4. Achieve a technology platform for semantics-based cultural communities, which is engaging for the user and which preserves and augments meaning when used.
> 5. Enhance the conceptual instruments of cultural heritage through an investigation into the formal modelling of memetic structures and demonstrate their use through EMMA

B.2 Relevance to the objectives of the IST Priority

Contribution to IST Call specific objectives

Within the strategic objective *Access to and preservation of cultural and scientific resources*, research in general focuses on improving the meaning and experiences people get from cultural and scientific resources existing in electronic form. For the 5th call, RTD research should address the following specific goals: To develop system and tools which support *"the emerging complexity of digital cultural and scientific objects and repositories, through enriched conceptual representations and advanced access methods"*

In particular, the research should focus on "the conceptualisation and representation of digital cultural and scientific objects, of multiple forms and origin, to exploit the potential of these resources for developing new forms of interactive creative experiences. This requires methods, systems, tools and enabling technologies to support indexing, retrieving, aggregating, using and creatively exploiting primarily non-textual and complex objects and their integration into sustainable digital library services."

EMMA is focusing its work on the following aspects of the current call:

Call objectives	EMMA Contribution
"Conceptualisation and representation of digital cultural and scientific objects, of multiple forms and origin"	• Use of emerging semantic models for content and associated semantic annotations to achieve a common representation across domains. • Definition of the internal model of "memes" + meme taxonomy • Full compatibility with semantic web technologies while keeping CH requirements in focus
"Exploit the potential of these resources for developing new forms of interactive creative experiences" "Participative and creative exploitation of cultural heritage by citizens and cultural institutions"	• Development of the semantic social software component and the narrative component in EMMA • Concept of memes

Briefing of Unit xx, Cultural Heritage Applications and , for potential participants[21]

Integration into sustainable library services	• Management of semantically enriched, mixed media objects
Tests in real but innovative scenarios[22]	•

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[21] Reference to presentation of pat mansion
[22] Reference to presentation of Pat Manson …..

Domain ontologies	• ontology of narrative structure • taxonomy of memes • computer accessible models of discourse based on knowledge and content objects
Application models	• add back in from version 3.0

EMMA explicitly excludes the following issues from its investigational scope:

Call Text *not* addressed by EMMA	REASON FOR *EXCLUSION* FROM THE SCOPE
Virtual reality and visualisation	EMMA is building a semantic infrastructure which is independent of how the information is visualised. In technology tracking, we will ask ourselves whether the EMMA designs would be able to handle emerging formats and standards.

Contribution to IST programme objectives:

EMMA addresses IST overall objectives as follows:

IST Programme Objectives	EMMA Contribution
"to overcome weaknesses in areas which are critical for European competitiveness and for addressing societal challenges: this is the case for the areas of generic software and computing systems, and in content development tools"	**Strengthening European competitiveness:** EMMA contributes to better content development tools which benefit industries that make use of such tools, such as is the case with gaming, educational, and entertainment industries. EMMA's concept of an electronic "social content engine" may be of particular interest to telecommunication providers, which are looking for new applications to drive the adoption of broadband. It is also of interest to media companies looking for cheap, efficient ways to produce a diverse array of "smart," self-describing audiovisual content that can be made available on a wide variety of platforms and devices. **Addressing societal challenges:** *Strengthening the understanding between different communities within Europe:* EMMA aims at using technology-based services in order to support a new emerging paradigm on how cultural resources can be used to

	enhance, and possibly reshape, the relationships between cultural assets and people, contributing thus to the better understanding between different communities within Europe.

Furthermore, in order to *promote an inclusive European information society*, EMMA will engage, model and help express the viewpoints of diverse, and sometimes less privileged, communities, empowering them through interaction and participation in the construction of meaning.

Empowering European citizens : While most existing approaches to digital heritage so far are firmly anchored to promoting the authoritative, canonical voice of collecting institutions (the museums' "unassailable voice", in Walsh's words[23]), EMMA focuses on empowering the European citizens – the members of the diverse cultural communities of Europe – as pivotal agents for the construction of cultural meaning, through discourse and interaction with cultural assets, which are organised in narrative and syntactic compositions that are aligned with the "deep structure" of European culture. |
| **"to exploit new opportunities and respond to emerging needs**: examples include […] context-aware knowledge handling" | EMMA will develop, enable, or enhance a number of products and services that are of interest to Europe's cultural heritage, media and technology industries, including:

Personalised media Personalised multimedia presentations assembled from archival and produced content (especially useful for news, documentary, travel, educational, cultural content); Personalised messaging integrating popular and personal media content; Delivery of summarised media content to mobile devices;

Media recommendation Finding media of interest by analysing patterns of annotation, creation, and use; Discover similar or related content through semantic relations between annotations; |

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[23] Walsh, Peter (1997): The Web and the Unassailable Voice. Paper at the Museum and the Web Conference. http://www.archimuse.com/mw97/speak/walsh.htm

	Media search Adaptive media templates which can be populated by media search results; Rule engines for automatically editing search results into coherent presentations; Finally, this research will ultimately respond to the increasing desire of consumers wanting to become more involved in the production and distribution of content - a trend which is highlighted by the developments in the Open Source and Creative Commons movements. EMMA enables new content production models in which citizens are not merely passive consumers but active producers – in particular by taking advantage of the developments in the Open Source and Creative Commons movements.
"to ensure the co-evolution of technology and applications so that technology advances are exploitable in innovative products and services. Particular attention will be paid to users' needs and to usability and accessibility of technologies and applications"	Practice-driven innovation aims to bring together sectors that traditionally have remained separate but which stand to benefit from cross-fertilisation such as education, cultural heritage, and gaming.

Contribution to ERA objectives:

ERA Objectives	EMMA Contribution
"to contribute to the creation of a European Research Area by stimulating and supporting programme coordination and joint activities conducted at national or regional level, as well as among European organisations, and thus help to develop the common knowledge base necessary for a coherent development of policies"	EMMA partners take part in important national and international initiatives in the areas of semantic systems and digital culture/CH. This involvement in both national and international research projects guarantees a strong interlinkage with, and potential leveraging of, national and European RTD investments (for details on partner involvement, see part B3)

Contribution to IST policy objectives: the i2010 strategy

In addition to the contribution of the Call specific objectives, the proposed activity clearly addresses issues of current EC policy as proposed in the new strategic framework for IST development, the *i2010 – European Information Society 2010* policy[24].

With regards to *i*2010, EMMA addresses in particular the following two priorities:

- Building a Single European Information Space, and

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[24] Communication of the Commission of the European Communities, June 1, 2005, COM(2005) 229 final.

- Achieving an Inclusive European Information Society.

Building a Single European Information Space:

Providing a critical mass of digital content has already been one of the primary objectives addressed in the EU's *e*Europe Action Plan launched in 2000 and covering the period until 2005. This Action Plan also clearly pointed out the important role of cultural heritage institutions with their vast treasures of unique resources as being in a unique position and strong stakeholder to contribute to the provision of a critical mass of digital resources as basis for the digital economy.

Supported by the Lund Principles and the Lund Action Plan[25], the focus of the *e*Europe Action Plan was mainly on the digitisation of vast amounts of cultural heritage artefacts and the creation of large repositories of digital cultural objects according to international standards[26]. However, content enrichment and the creation of meaningful connections and interrelations between legally secure digital objects so far have not been the focus of activities carried out under the *e*Europe Action Plan.

Thus, although the provision of a critical mass of digital resources and the role of cultural heritage institutions for creating such contents as formulated in the *e*Europe Action Plan are still valid, the objective of building a single European Information Space as described within *i*2010 has shifted its focus from *quantity* to *quality*, calling for the creation and provision of *rich*, *diverse*, *compelling* and *legally secure* digital content that is *interoperable* and can be delivered over various platforms and networks.

These new challenges will also be addressed in more detail by the New Dynamic Action Plan (the successor to the Lund Action Plan) that is currently prepared on behalf the Cultural Affairs Committee (CAC) of the Council of the European Commission by the National Representatives Group. This New Dynamic Action Plan is due to be launched under the UK-Presidency, in November 2005.

EMMA contributes to both the objectives of the *i*2010 strategy and the New Dynamic Action Plan by proposing a novel way of creating and managing semantically enriched digital content resources. In trying to tap into both, the detailed, scientifically grounded, standardized object descriptions of cultural experts and curators as well as the knowledge provided by cultural enthusiasts and other citizens who actively participate in online discussions, thematic forums or other online activities, EMMA seeks to achieve semantically meaningful digital content enrichment on a broader scale. Although the European Commission just recently launched the *e*Content Plus Program which particularly addresses the issue of (semantic) content enrichment, *manually* adding metadata to existing resources, annotating objects or creating meaningful relationships between individual objects will not suffice to generate the critical mass of digital content resources needed to spurn the digital economy. In any case, curators do not scale well, meaning that they cannot afford the necessary resources to carry out content enrichment projects on a large scale, over extended periods of time.

We therefore need to seek solutions to either (partly) *automate* the process of content enrichment or involve the public at a broader scale to supply *their* knowledge. Looking at

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[25] For further information, see http://www.cordis.lu/ist/digicult/eeurope.htm

[26] On the European level, these objectives were vigorously supported and pursued by the activities of the National Representatives Group and the Minerva project, both aiming at the coordination of digitisation initiatives and the promotion of best practice in the field of cultural heritage.

current developments in the area of social software and observing the participation of altruistic citizens who voluntarily provide and publish their knowledge in Wikis, blogs, etc., EMMA's approach of trying to combine both – semi-automation and public annotation through utilisation of social discourse - seems to be highly promising.

In addition, with regards to *legally secure content* and *intellectual property rights*, EMMA will investigate the usefulness and applicability of various licensing schemes such as GNU, Open Source, and Creative Commons licenses to provide legally secure content resources, thus contributing to and supporting a strong public domain for digital cultural resources as one vital component of the European Information Space.

Achieving an inclusive European Information Society

In addition to contributing to Building the European Information Space, the EMMA also relates to the third priority of the *i*2010 strategy, calling for *e-inclusion, better public services and quality of life*.

Although e-inclusion in the *i*2010 policy framework is mainly defined as making available the technical infrastructure and issues such as equal opportunities, ICT skills and regional divides, e-inclusion also means to fully exploit the potentials of ICT as a profoundly democratic medium that opens up new possibilities for communication and participation. A view on the Internet that only stresses the supply side (public information and service offerings pushed towards citizens), falls short in acknowledging the power of ICT to stimulate social discourse and the participation of other than main stream voices.

EMMA intends to actively tap into this stream of public discourse that currently develops a very strong voice on the Internet as citizens – using Wikis, blogs and other social software tools – start to create their own content offerings and annotate content that is important to *them*. If we want to benefit from these socially inspired developments that happen in parallel and mostly detached from the official, institutionalised cultural discourse, we need to actively create a link between the two.

By building a system that works as an exchange between the curatorial voice and the potentially culturally diverse public voice - giving equal value to both and not considering the one more important or valid than the other - EMMA seeks to establish a mechanism that allows citizens to *regain* ownership of their cultural heritage by adding their own, personal story. Thus, EMMA provides a mechanism that reinforces and fosters Europe's cultural diversity, by making cultural creations not only *available* but *meaningful* to a wider number of citizens.

In this sense, EMMA also contributes to the proposed digital library of multicultural and multilingual resources of Europe's rich heritage that has been identified in the i2010 strategy as one of the three initial priorities to raise the awareness of how ICT add to the quality of life.

B.3 Potential impact

Reinforcing competitiveness and solving societal problems

According to the new strategic framework, **i2010 – European Information Society 2010, laying out broad policy orientations,** Information and Communication Technologies lay claim to be an important driver of social inclusion and improvement of the quality of life of the European citizen, which, in turn, could be a significant factor in *promoting an open and competitive digital economy*. A central element in order to achieve this goal is the cultural understanding between Europeans, at a time of increased mobility within the expanded European Union. To contribute to this goal, EMMA aims at using technology-based services in order to support a new emerging paradigm on how cultural resources can be used to enhance, and possibly reshape, the relationships between cultural assets and people, contributing thus to the tightening of ties between different communities within Europe. The EMMA approach addresses directly the level of cultural experiences and approaches by Europeans which, on the one hand, illustrate the richness and variety of the cultural traditions in the European regions – those that are manifested in the instances of cultural artefacts and object histories related by them in different national and local cultural practices – while, on the other hand, are historically interconnected through their dependence on common meaning structures, prototypical narratives and "folk taxonomies" (in anthropological terms) which, in effect, constitute the commonality of European culture without refuting the diversity of our continent. In this sense, EMMA will contribute to supporting mutual understanding between Europeans, and thus, indirectly, to the democratic legitimacy of the European idea and institutions, which constitutes the foundation of the European Union.

EMMA focuses on cultural interaction and storytelling through a software tool, whereby users will be engaged in a discourse with cultural artefacts and information, creating, thus, multi-layered annotations of culture that are informed by different cultural communities' perceptions and ideas about self and other. In order to *promote an inclusive European information society*, EMMA will engage, model and help express the viewpoints of diverse, and sometimes less privileged, communities, empowering them through interaction and participation in the construction of meaning. While most existing approaches to digital heritage so far are firmly anchored to promoting the authoritative, canonical voice of collecting institutions (the museums' "unassailable voice", in Walsh's words[27]), EMMA focuses on empowering the European citizens – the members of the diverse cultural communities of Europe – as pivotal agents for the construction of cultural meaning, through discourse and interaction with cultural assets, which are organised in narrative and syntactic compositions that are aligned with the "deep structure" of European culture.

This approach warrants a significant advance in cultural heritage informatics tools and solutions, which aligns them with the innovative thinking of the last quarter century in the museums field highlighting the importance of visitors/users as members of "interpretive communities" (Hooper-Greenhill[28]), and of cultural places – real or virtual – as "contact zones" between diverse cultural identities (Clifford[29]). In a context whereby ICT advances in

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[27] Walsh, Peter (1997): The Web and the Unassailable Voice. Paper at the Museum and the Web Conference. http://www.archimuse.com/mw97/speak/walsh.htm

[28] Hooper-Greenhill, Eilean (1999): Museums and interpretive communities. http://www.amonline.net.au/amarc/pdf/research/paper2.pdf

[29] Clifford, James (1997): *Routes: Travel and Translation in the Late Twentieth Century.* Cambridge, MA: Harvard University Press.

cultural heritage applications are typically misaligned with the understanding, traditions and trends within the cultural heritage field proper, the approach taken by EMMA constitutes a significant departure, aiming to provide solutions that are going to be practically useful in the cultural heritage communication domain.

Finally, the focus of the EMMA project on mediating content access through latent meaning structures (**memes**), which, regardless of taking different form – through artefacts and other cultural expressions - among different European communities, are constitutive parts of the Europeans' socially constructed knowledge about their identity (in the sense of Berger and Luckman[30]), contributes to creating more usable, accessible knowledge resources to European citizens and, thus, acts as a factor towards inclusion to the European information society. Yet, the mechanisms and tools formulated by EMMA will not only be of interest in cultural heritage communication, but it in all other domains where it is important that complex knowledge is communicated through meaning structures – narratives, descriptions, arguments – that are familiar to particular communities of users.

In particular, EMMA's concept of an electronic "social content engine" may also be of great interest to telecommunication providers, who are looking for new models of media use to drive the adoption of broadband, as it presents an alternative to the standard view of broadband as nothing more than a "fatter pipe." It is also of interest to media companies looking for cheap, efficient ways to produce a diverse array of "smart," self-describing audiovisual content that can be made available on a wide variety of platforms and devices. Finally, this research will ultimately benefit the public, by enabling present-day consumers of media content to become more involved in its production and distribution.

Our work will develop, enable, or enhance a number of products and services of interest to Europe's cultural heritage, media and technology industries, including:

- *Personalized media*
  - Personalized multimedia presentations assembled from archival and produced content (especially useful for news, documentary, travel, educational, cultural content)
  - Personalized messaging integrating popular and personal media content
  - Delivery of summarized media content to mobile devices
- *Media recommendation*
  - Finding media of interest by analysing patterns of annotation, creation, and use
  - Discover similar or related content through semantic relations between annotations
- *Media search*
  - Adaptive media templates which can be populated by media search results
  - Rule engines for automatically editing search results into a coherent presentations

The creation of such grass-rooted cultural heritage content and related metadata through automatic multimedia signal analysis or through manual annotation on the scale and with the reliability to meet the needs of users is an unsolved and important problem for academic researchers and industry. Our research in EMMA will combine several approaches and insights to address the challenges and opportunities of media content and metadata:

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[30] Berger, Peter and Luckman, Thomas (1966): *The Social Construction of Reality: A Treatise in the Sociology of Knowledge.* Garden City, NY: Doubleday.

- The power of enthusiast communities and social networks to catalyse the creation, sharing, and reuse of networked media metadata;
- The ability of ontologies to help disambiguate and extend user-created metadata;
- The creation of sample applications that *use* media metadata to retrieve, share, and remix media in order to motivate the annotation of media by enthusiast communities.

The approach taken in EMMA is that the best way to achieve widespread manual annotation of multimedia content and *de facto* multimedia annotation and presentation standards creation is through the development of a "social content engine" that will allow enthusiasts to find, annotate, share and use content of interest. A system built for an amateur, "enthusiast" user community, motivated by enjoyment or the desire for social capital, would avoid the expenses of annotation labour that we know from professional media production environments. Moreover, this approach improves on already existing trends in community-driven data and meta-data generation, such as blogs[31], wikis[32], managing engines[33], recommender engines[34], social-based open source developments[35] and social-based discourse developments[36]. That the communities operate on a multi-national level is an extra asset of the EMMA project. In other words, through EMMA' technology, people from all over Europe will be provided with multimedia-based tools allowing them to better discuss, annotate, study and advise on the relevance of cultural artefacts for them besides the 'classical' interpretations by large cultural institutions, such as museums. Thus EMMA will also benefit Europe by creating innovative multimedia tools which will also be generically usable in other communities wishing to collaborate using today's electronic means.

Thus in terms of both content and method, we believe that EMMA will make a contribution to *European cultural heritage* on the one hand, and to *European competitiveness* on the other hand.

Relation to research activities on the European and National level

We will seek to establish active working relationships and continuous knowledge exchange with relevant ongoing and newly launched projects within the 6th Framework Programme. In addition, we will also re-use already achieved research results from completed projects. Of particular interest are of course the European research activities related to areas such as knowledge technologies and cognitive systems, learning, leisure, and of course, cultural heritage. At present, the following projects are of particular relevance to EMMA:

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31 Nardi B. A., Schiano, D. J., & Michelle Gumbrecht (2004). Blogging as social activity, or, would you let 900 million people read your diary?, Proc. ACM Conf. on Computer supported cooperative work 2004, Chicago, Illinois, USA, pp. 222 - 231, 2004.

32 Wikipedia (2005). http://en.wikipedia.org/wiki/Main_Page, WikiWiki (2005). http://c2.com/cgi/wiki?WikiWikiWeb

33 Del.ico.us - a social bookmarks manager (2005). http://del.icio.us/, Flickr -online photo management and sharing application (2005). http://www.flickr.com/

34 Amazon – media seller with recommender system (2005). http://www.amazon.com, Internet Movie Database (IMDB) (2005). http://www.imdb.com/, Jester – a recommending systems for jokes (2005): http://shadow.ieor.berkeley.edu/humor/, The Virginia Tech Expertise Database (VTED) (2005). http://www.research.vt.edu/vted/

35 Open Mind Iniative (2005). http://www.openmind.org/

36 Buckingham Shum, S. & Selvin, A. (2000). Structuring Discourse for Collective Interpretation. Electronic proceedings of Open Conference on Collective Cognition and Memory Practices, September 19-20, 2000. http://www.limsi.fr/WkG/PCD2000/indexeng.html

Project / Status	Focus	Relation to EMMA / potential for cooperation
BRICKS (IP – ongoing)	Building a new generation of digital libraries as an open, networked system that integrates distributed collections of multimedia resources form various cultural heritage institutions	Technologically, the BRICK approach to dealing with heterogeneous distributed data sources should be considered by EMMA, as database integration per se is not a research issue in the EMMA project. Clustering with BRICKS would strengthen the convergence of the technological basis for systems solutions in the CH sector.
CALIMERA (CA – completed)	Understand the needs and requirements of small local and regional Archives, Museums, Libraries with respect to cultural applications as developed in IST research and development (organisations of 42 countries involved).	Re-use of research results with regards to the requirements of local and regional CH institutions on technologies, standards, and research; use the CALIMERA network to promote those results that are of specific value to local and regional institutions, in particular the research made on usability (CALIMERA review on usability of ICT-systems and CALIMERA usability guidelines); use the CALIMERA database on CH technology vendors to identify potential clients for the EMMA technology road show (see WP 8).
DELOS (NoE – ongoing)	Integration and coordination of European research in the field of digital libraries (DL architecture, information access, personalisation, involving complex CH objects)	EMMA will inform and where possible cooperate with DELOS Research Clusters (RC), in particular: Information Access and Personalization (RC2) and Knowledge Extraction and Semantic Interoperability (RC5). EMMA partners either take part in DELOS (CWI in RC2) or have established working relationships with DELOS partners.
EPOCH (NoE – ongoing)	Fostering take-up of ICT through building an integrated 'information pipeline' and related tools and services for CH research, management and mediation.	EMMA's RTD results will be of interest for several nodes, tools and services in the EPOCH 'pipeline'. EMMA coordinator SRFG will become a member of EPOCH by the end of 2005.

Minerva and Minerva Plus Network (CA – ongoing)	Promote and foster awareness for the Lund principles and generally, to harmonise digitisation activities in the member states and encourage best practice in digitisation in CH institutions Europe-wide.	EMMA is aware and will take into consideration the results from the Minerva projects with regards to creating a common European platform, recommendations and guidelines about digitisation, metadata, long-term accessibility and preservation. EMMA will also try to "market" its results through the extensive Minerva Network, which reaches into all member states. One objective will also be to demonstrate EMMA to the National Representatives Group (see exploitation and dissemination plan)
aceMEDIA (IP – ongoing)	Build a system to extract and exploit meaning inherent to the content in order to automate annotation and to add functionality that makes it easier for all users to create, communicate, find, consume and re-use content	Ongoing clustering activity through exchange of key deliverables with METOKIS, particularly in the area content and knowledge modelling.
AIM@SHAPE (NoE – ongoing)	To advance research into semantic-based shape representation and semantic-oriented tools to acquire, build, transmit, and process shapes in which knowledge is explicitly represented, and can therefore be retrieved and processed to construct new knowledge.	SRFG – no clustering
AGENTLINK (CA – ongoing)	Gathering and systematically disseminating knowledge on agent-based research.	Use as information base on latest results in agent technologies research; use as dissemination platform for own research results for the European Meme and Memory Agent (EMMA)
METOKIS (STREP – ongoing)	Methodology and tools infrastructure for the creation of knowledge units	SRFG will bring existing KCO knowledge and KCCA exchange architecture into EMMA
SEKT (IP – ongoing)	Development of software to semi-automatically learn ontology and extract metadata, and to maintain and evolve the ontology and metadata over time; methodology for using semantically based	Exchange of deliverables with EMMA

	knowledge management	
CONTENT4ALL (STREP – ongoing)	Cross platform tools for community content publishing based on a peer-to-peer cross-media intelligent content management model.	SRFG: No contact yet, but will be approached for collaboration with EMMA
INSCAPE (IP – ongoing)	To enable ordinary people to use and master the latest technologies for interactively conceiving, authoring, publishing and experiencing interactive stories independent of their form (theatre, movie, cartoon, puppet show, etc.); interactive story telling.	Although INSCAPE focuses in particular on the creator and author of a story, its conceptualisation and methodology of building interactive stories and narratives may be of great relevance to EMMA, especially in the first phase of the project.

Interlinkage with, and potential leverage of, national and international R&D investments and activities

EMMA partners take part in important national and international initiatives in the areas of semantic systems and digital culture/CH. The following should illustrate the strong interlinkage with, and potential leveraging of, national and European investments (only the most evident examples are included):

In Austria, the Federal Ministry of Transport, Innovation and Technology's FIT-IT programme (www.fit-it.at) funds advanced research in selected areas that correspond to the strategic objectives as defined by the EU FP6 IST Priority. In the area of Semantic Systems, EMMA coordinator SRFG runs the project DynamOnt - Methodology for dynamic ontology creation (2005 -2007), and has confirmation that another project – Grisino - Grid Semantics and intelligent objects (2006-2007)– is selected for funding. Furthermore, SRFG is involved in the eFit Austria/eCulture programme (www.efit.at) of the Federal Ministry for Education, Science and Culture. SRFG has been commissioned by the Ministry to run the Austrian Initiative for Digital Cultural Heritage (2003-2005, www.digital-heritage.at), and to join the European MINERVAPlus (2004-2005) project in order to leverage and interlink the ongoing activities on the national level.

In the Netherlands, the EMMA partners Centrum voor Wiskunde en Informatica (CWI) and the University of Twente (HMI group) are among the leading institutions in the large national MultimediaN initiative (2004-2008, www.multimedian.nl) funded under the BSIK scheme (Decree regarding Subsidies for Investment in the Knowledge Infrastructure). In particular, CWI and HMI are involved in eCulture R&D and demonstration projects funded by the MultimediaN foundation. Furthermore, they participate in the CATCH (Continuous Access to Cultural Heritage) programme funded by the Netherlands Organisation for Scientific Research (NWO).

In Finland, the semantic portal MuseumFinland and the large FinnONTO project (2003-2007), both led by EMMA partner Helsinki University of Technology (TKK) represent major research investments towards semantically enhanced information services. FinnONTO is financed by the National technology agency Tekes and 26 companies and public organizations.

Regarding international research activities, we consider EMMA's alignement with the ongoing developements in ontologies for cultural information most noteworthy. EMMA partner Consiglio Nazionale delle Ricerche through the Laboratory of Applied Ontologies has contributed extensively to these developments (e.g., harmonisation of the CH ontology CIDOC/CRM and the ABC ontology), and will also do so through ontological models as developed in the framework of EMMA.

The strong involvement of all the partners in national research programs, and their ability to bring their specific expertise also on the European level, is a clear value added, also with regards to the objectives of a strong European Research Area.

Dissemination, demonstration, and exploitation of EMMA results

EMMA will run a consistent set of activities that ensure that projects results become known and used by the three main target groups: S&T community, technology vendors and service providers, cultural memory and community organisations as well as other important multipliers. (These activities are described in detail in Workpackages 7 & 8).

Reaching the S&T community

Dissemination of interim and final scientific and technological results will mainly be done in the following form:

- conference posters, presentations in relevant sessions and workshop, and proceedings papers (e.g., ACM Transactions on Multimedia Computing, Communications, and Applications – ACM TOMCCAP[37], IEEE Multimedia[38], Hypertext, Intelligent User Interfaces, International Semantic Web Conference, etc.…);

- articles in relevant journals (e.g., International Journal of Human-Computer Studies, IEEE Multimedia, Journal of Data Semantics, Journal of Applied Ontology, International Journal of Metadata, Semantic, and Ontologies, Springer Multimedia Tools and Applications, etc.)

Furthermore, EMMA S&T partners will notify relevant standards working groups about research results that may be of interest to consider in new or updated recommendations or specifications in areas such as…

Reaching technology vendors and service provider: Demonstrating and exploiting the EMMA system - The EMMA technology road show

One of the major problems with RTD-projects is adequate uptake of project results once the project is completed. In most cases, the results, tools and components developed remain within the small circle of project participants, and hardly make it outside the consortium. While the EC Framework Programme for technological research and development specifically encourages the participation of SMEs, the problem with small companies is that in many cases their business success relies on one core technology that serves a very narrow niche market. Thus, while they might be able to incorporate individual technology components that perfectly supplement their core technology, they rarely take up the complete system that has been developed within the EC co-funded project.

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[37] http://www.acm.org/tomccap/

[38] http://www.computer.org/portal/site/multimedia/

Another problem with leading-edge technologies is that the target sector in many cases lacks the necessary knowledge to evaluate and assess the potential of these technologies. While the project consortium spends considerable time and effort to learn about these new technologies, one cannot expect from companies not being involved in the project to fully grasp the potential of newly developed software and tools simply from write-ups or brochures. Thus, the notion that technology take-up can be sufficiently fostered by publishing the project results or even by making the prototype available for public exploration, underestimates the actual effort it takes to learn and understand new technology and its potential.

We therefore propose an innovative way of fostering the exploitation and technology uptake by actively demonstrating the EMMA-system to selected technology vendors in the cultural heritage, media publishing and educational industries, who may be interested in EMMA as tool for community building to nurture long-term relationships with their customers. Instead of expecting companies to detect documentation of EMMA results by chance (company pull), the technology road show is an active outreach to establish business relations with companies who are most likely to become potential vendors of EMMA technology components.

Overall, we will identify 20 companies from different sectors Europe-wide that are the most likely candidates to have an interest in EMMA technologies, for example the providers of large community portals. We will then organise demonstrations of EMMA directly at vendor premises, where we explain the system in a full day workshop, explaining in detail the technical components and underlying technical concepts. In these demonstrations, vendor companies receive the opportunities to clarify questions directly with the technologist involved in developing the system, as well as professionals who can give information on the usage potential of the EMMA system (i.e. the researchers involved in working with the user groups). Drawn from the results of the DigiCULT Forum and CALIMERA projects, a list of potential vendors who might have an interest in the EMMA technologies is included in the Annex 6.

The EMMA technology road show is scheduled for the last six months of the EMMA project, and will be organised and carried out by SRFG, Intersoft, TII-v4m and PRC Group. The final selection of companies to be approached will be made by the STM Core Team.

Reaching cultural memory and community organisations

Activities here will include presentations at selected conferences and events, e.g. ICHIM, Museums and the Web, NODEM - Nordic Digital Excellence in Museums, [organised by EMMA partner Interactive Institute], ECDL, etc.), as well as direct spreading of information to relevant major organisations and cultural networks. To this purpose, we intent to make extensive use of existing contact databases accumulated and hosted by partner organisations (DigiCULT Forum, CALIMERA, etc.) and existing European-wide networks (Minerva, National Representatives Group, etc.).

In addition to demonstrating the technological functionalities of EMMA, we will author a series of showcases in form of illustrative demos of stories and social software forums in the later phase of the project. These EMMA showcases will be target group specific, for example, showcases for cultural heritage and related communities as opposed to showcases for technology vendors. We envision to showcase EMMA for example in the context of ARS Electronica, focusing on how EMMA has taken into account the greater developments in society that are creating a new digital dimension for human activity and life.

The idea is to curate an exhibition that allows us to envision the new activities possible through the combination of our (social) software and cultural heritage materials. The

exhibition contents can be created through a series of community-oriented workshops. These workshops will feature artists, cultural heritage specialist, designers, historians, storytellers, etc who have been pre-selected and trained to work with the EMMA software. Together with a community, they will produce a piece, or event for the exhibition.

This exhibition then could be shown once, as a demonstrator as part of the EMMA technology road show, and secondly, as a travelling exhibition, in re-known venues that offer the capacity to present in diverse media formats, such as the Museum of the Future at Ars Electronica (Linz, AT) or the ZKM in Karlsruhe (DE).

We perceive these showcases to be self-running demonstrations, featuring different aspect of the EMMA system that could run as stand-alone applications, for example at conferences, on the EMMA website, or in the "Investors Room" on IST Results, the results platform for IST-funded research projects[39].

Reaching central multipliers

In addition, EMMA will pay special attention to reaching important multipliers to distribute knowledge on EMMA results to various target communities. Such important multipliers include, for example, the European Innovation Relay Centres[40], creative industry clusters (for example, the Content Business Cluster in Finland), or national technology agencies such as Tekes.

Added value in carrying out the project at European level

Following, are the arguments, why EMMA should be carried out at the European level:

First, in terms of ICT research, neither one of the partners would possess all the expertise needed to carry out such a complex project. As a matter of fact, EMMA draws on three different research strands, i.e. semantic tagging and modelling of cultural objects, understanding social science artefacts and objects through semiotics, and finally, research based on discourse analysis and story composition, etc. The types of competencies needed in order to tackle the research challenges of EMMA demands cooperation by different partners that are spread all over Europe. As also shown in the following section, the project consortium brings together some of Europe's leading organisations in the above mentioned research fields. In this sense, as already mentioned in section B2, EMMA also strengthens the European Research Area.

Secondly, with its concept of memes, EMMA tries to detect and formally describe some of the latent structures that form the communalities but also differences between different European cultures. The meme concept clearly surpasses the level of description and representation of individual cultural artefacts from different countries or traditions, as they form a "meta-structure" that can only be detected by comparing structural patterns that emerge from making explicit and disambiguate major underlying themes in European culture which are apparent in artefacts from culturally and geographically very diverse regions of Europe.

Thirdly, there is also a technological necessity to carry out EMMA at the European level. All the technical partners have extensive experience with cultural heritage metadata and

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[39] http://istresults.cordis.lu/

[40] http://irc.cordis.lu/

integration of heterogeneous data sources in the cultural heritage sector. Yet, as a matter of fact – and being an example of one of the major problems in the cultural heritage sector, they all have their own technical solutions. The great challenge no is to draw from these research results, and create a single technical solution.

B.3.1 Contributions to standards

Attempts to bridge the semantic gap exclusively via signal processing technology or manual annotation failed because they covered only one side of the same coin. Approaches in AI-MM that tried to combine both sides by merging methodologies and technologies from the digital library and knowledge representation communities entered a *cul-de-sac* because they required data that was only available through human annotation, which had not been economically feasible. Further approaches in AI-MM to make use of work processes focused on professional users only, which hindered a wide spread use of the created media as well as the related metadata, as those are understood as financial assets of the producers that needed protection. The work of large multimedia standardization bodies[41], do not receive wider adoption out of similar reasons (patents) but are additionally problematic as they try to cover too much ground and thus become to complex to be understood by the everyday media producer or consumer. Community-driven metadata production, on the other hand, addresses the problem from the other end of the spectrum, namely the consumer side but runs against similar barriers. The work provided by EMMA can inform and improve all of these various activities, yet in particular, the EMMA workplan focuses on building upon the current standards situation in the field of cultural heritage information, and expand on it through identifying particular areas and challenges where significant work is needed.

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41 Art and Architecture Thesaurus (2005): http://www.getty.edu/research/conducting_research/vocabularies/aat/

Union List of Artist Names (2005): http://www.getty.edu/research/conducting_research/vocabularies/ulan/

Iconclass (2004): http://www.iconclass.nl/

Dublin Core (2005): http://www.dublincore.org/

W3C – OWL (2005): http://w3c.org/2004/OWL/

W3C - RDF (2005): http://w3c.org/RDF/

W3C – RDF (2005): Schema http://www.w3.org/TR/rdf-schema/,

W3C - Semantic Web (2005): http://w3c.org/2001/sw/

W3C - XML (2005). http://w3c.org/XML/

W3C - XML Schema (2005): http://w3c.org/XML/Schema

W3C – HTML and XHTML (2004): http://w3c.org/MarkUp/

W3C - SMIL (2005): http://w3c.org/AudioVideo/, W3C - SVG (2005): http://w3c.org/Graphics/SVG/, W3C – HTML and XHTML (2004). http://w3c.org/MarkUp/

ISO MPEG-4 (2001): http://www.cselt.it/mpeg/standards/mpeg-4/mpeg-4.htm

ISO/IEC. *Text of ISO/IEC 15938-1/FDIS Information Technology - Multimedia Content Description Interface - Part 1: Systems.* ISO/IEC JTC. 1/SC 29/WG 11/ N4285, Singapore, March 2001.

ISO/IEC. Text of ISO/IEC 15938-2/FDIS Information Technology - Multimedia Content Description Interface - Part 2: Description Definition Language. ISO/IEC JTC 1/SC 29/WG 11 N4288, Singapore, September 2001.

ISO/IEC. Text of ISO/IEC 15938-3/FDIS Information Technology - Multimedia Content Description Interface - Part 3: Visual. ISO/IEC JTC 1/SC 29/WG 11/N4358, Sidney, July 2001.

ISO/IEC. Text of ISO/IEC 15938-4:2001(E)/FDIS Information Technology - Multimedia Content Description Interface - Part 4: Audio. ISO/IEC JTC 1/SC 29/WG 11/N4224, Sydney, July 2001.

ISO/IEC. Text of ISO/IEC 15938-5/FDIS Information Technology - Multimedia Content Description Interface - Part 5: Multimedia Description Schemes. ISO/IEC JTC 1/SC 29/WG 11/N4242, Singapore, September 2001.

ISO/IEC. MPEG-21 Overview v.5. ISO/IEC JTC1/SC29/WG11/N5231, Shanghai, October 2002. http://www.chiariglione.org/mpeg/standards/mpeg-21/mpeg-21.htm.

As noted in the technical description, EMMA follows a structured approach in modelling all levels of the "interpretive cycle" for digital cultural communication, from extracting meaning from cultural objects to interaction between users of these objects. With regard to the representation of cultural objects, it builds upon the lower ontology of CIDOC Conceptual Reference Model. As EMMA focuses, however, on a particular aspect of cultural objects, their *about*ness – i.e., what these objects represent, and what they tell us about the people, places and events which they depict or talk about – it is clear that it will address issues of terminology and standards that were, typically, dealt with by standards such as the ICONCLASS iconographic classification for visual art, or the Sheffield History Index Classification for social history and ethnographic materials.

Taking one step forward from current work on thesaurus alignment (such as by Doerr for AAT and Merimee[42]), EMMA aims to contribute to developing expressive, coherent and effective formalisms for describing, firstly, individual meaning elements in representational cultural objects (figurative art, photographic materials, narrative stories) – such as pictorial motifs and *lexias* – and, secondly, representing and ascribing meaning (through accurate and complete identification, collocation and composition) to macro-structures bringing together ordered (or otherwise structured) sets of individual cultural objects. The emphasis here will be on establishing standard formalisms and descriptors for identifying information entities relevant to the representation of *what happens* in a photograph, work of art or other cultural object – in effect, exactly what is of most interest to most people accessing physical or virtual cultural materials. It will do so using an overlay approach so that the added value of EMMA in the standards field will complement, rather than duplicate, effort by others.

In this context, the EMMA consortium will establish links and consult with organisations which are active in the field of cultural heritage informatics standards, such as the International Committee of Documentation of the International Council of Museums (CIDOC/ICOM), the Museum Documentation Association in England (MDA), the Getty Foundation research centre (USA), the Canadian Heritage Information Network (Canada), the Visual Resources Association (USA) and others. The domain and functional ontologies to be defined in the course of the EMMA project will be made available, through the dissemination and peer review mechanisms already planned in the project, to organisations in the cultural heritage and research field, and the trials organised in the course of the project will help identify and improve these formalisms with a view to generality and applicability in the broader cultural heritage documentation domain.

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42 See Doerr, Martin (2001): Semantic problems of thesaurus mapping. Journal of Digital Information, Volume 1 Issue 8; http://jodi.tamu.edu/Articles/v01/i08/Doerr/

B.4 The consortium and project resources

The Members of the project consortium and their role

The consortium consists of the 11 partners (from 9 European countries) that represent renowned universities and other research centres as well two SMEs (short partner descriptions are included below; more details are to be found in Annex 1).

Complementarity of expertise:

The EMMA partners collectively bring together, and will build on, the required conceptual, technological and other expertise in:

- Knowledge analysis and formalisation [K-A/F]
- Knowledge technologies [K-T]
- Dynamic multimedia [DyMM]
- User interfaces & interaction [U-i2]

The individual partners' core expertise is indicated in the table below. Further indicated is their participation in:

- technical pilots [TP] in which EMMA Search, Retrieval & Contextualisation technologies are tested on larger content repositories; and
- user pilots [UP], in which the EMMA User Agent and Discourse Community Manager are tested & validated under real world conditions (more details on these pilots are provided in the next paragraphs).

No	Partner	Acr.	C.	Core exp.	Pilots
1	Salzburg Research (co-ordinator)	SRFG	A	K-T	
2	Centrum voor Wiskunde en Informatica	CWI	NL	K-T	TP
3	Consiglio Nazionale delle Ricerche (Laboratory of Applied Ontology)	CNR	I	K-A/F	
4	The Open University / Knowledge Media Institute	KMI	UK	DyMM	UP
5	University of Twente (Human Media Interaction Group)	UT	NL	DyMM	TP
6	PRC Group - The Management House <u>SME</u>	PRC	GR	U-i2	UP
7	University of Art and Design (Media Lab)	TAIK	FI	U-i2	UP
8	Tel Aviv University / The Porter Institute for Poetics and Semiotics (TAU)	TAU	IL	K-A/F	
9	Helsinki University of Technology (Semantic Computing Research Group)	TKK	FI	K-T	TP
10	Intersoft a.s. <u>SME</u>	Intersoft	SK	K-T	
11	Interactive Institute/Visions for Museums	TII	SW	U-i2	UP

Cultural heritage informatics & Collaboration with CH institutions:

Most of the partners have a considerable track record in cultural heritage informatics, and have participated in related RTD projects on the European and national level.

The partners' CH expertise, as required in EMMA, pertains to cultural content (incl. understanding of special collections, metadata and semantic annotation), user groups and communities, and cultural experiences (interactive multimedia, exhibitions, story telling).

In particular, the consortium can build on close working relationships with cultural institutions for technical trials and user test pilots. This will include:

- trialling EMMA technologies on the established semantic portal – MuseumFinland, *built, controlled and maintained by EMMA Partner TKK (SeCo)*;

- trialling EMMA technologies on the special digital collections of "The Memory of the Netherlands" initiative led by the *Koninklijke Bibliotheek - National Library of the Netherlands*; – an official declaration by the Library that guarantees access to the databases (metadata and content) is included in Annex 3. EMMA partners from the Netherlands, *CWI and the Univ. of Twente's HMI Group* will assist in these trials.

- user piloting of the EMMA user gent in the framework of a major exhibition of the *Stockholm City Museum* in cooperation with EMMA partner *Interactive Institute/V4M*; - an official declaration by the Museum is include in Annex 3.

- user piloting of the EMMA tools in the framework of a cultural study course at the New Media Laboratory of the Department of Communication, Media and Culture of Panteion University; - an official declaration by the Director of the New Media Laboratory is included in Annex 3.

Salzburg Research Forschungsgesellschaft mbH (SRFG) – Austria

Scientific and technical expertise

SRFG is a not-for-profit research & development company owned by the State of Salzburg. The company employs about 65 RTD and organisational support staff, and has expertise in knowledge and content technologies (e.g. Semantic Web, knowledge-enhanced content, tools for knowledge workers); middleware architectures, object-oriented programming, component-based software development, and quality-based internet technology. Socio-economic innovation and impact studies in areas such as e-learning and digital culture/heritage complement and inform this RTD. Furthermore, SRFG has in-depth expertise in project coordination as demonstrated in several successful EU-projects. (Further details are provided in Annex 1)

Role / contributions to EMMA:

SRFG will have three main functions in EMMA:
- it will serve as an overall co-ordinator of the project;

- it will contribute its know how as a software architect, designer and integrator of software components. EMMA will allow SRFG to build on its expertise in the area of document models and software components to encapsulate knowledge objects in digital media. More specifically, within the project we will design and prototype an architecture for managing and delivering knowledge-rich multimedia assets in order to support knowledge workers in various domains.

- it will contribute its expertise as a eCulture study centre with a strong focus on user interests & benefits, market opportunities, and cultural heritage institutions' barriers to entry regarding new (e-) cultural experiences.

SRFG's expertise in advanced semantic web and knowledge/content technologies, combined with the expertise of other European Centers of Excellence, will ensure that EMMA will be a technological flagship project in cultural heritage

Selected EU Projects

The following is a list of recent projects, selected with respect to their relevance for EMMA:

EU: FP6 and FP5 RTD projects

- METOKIS – Methodology and Tools Infrastructure for the Creation of Knowledge Units: 2004- 2005; co-ordinator; carrier architecture for task-related knowledge-content objects; http://metokis.salzburgresearch.at
- CULTOS - Cultural Units of Learning, Tools and Services: 2001-2003; co-ordinator; knowledge-aware multimedia authoring and presentation tools; www.cultos.org
- VICODI - Visual Contextualisation of Digital Content: 2002-2004; semantic contextualisation technology for archival information; www.vicodi.org

EU: FP5 Accompanying measures and studies

- DigiCULT Forum: 2002-2004; co-ordinator; technology watch mechanism for the cultural and scientific heritage sector, www.digicult.info
- MINERVAPlus, www.minervaeurope.org, partner; related national-level activity: Austrian Digital Heritage Initiative on behalf of the Austrian Ministry of Culture, www.digital-heritage.at
- EP2010 - The Future of Electronic Publishing Towards 2010: 2002-2003, study for DG INFOSOC; single contractor, http://ep2010.salzburgresearch.at

Centrum voor Wiskunde en Informatica (CWI) – Netherlands

Scientific and technical expertise

CWI is the research institute for mathematics and computer science research in the Netherlands. CWI has an outstanding international reputation, is an ERCIM member, and is also strongly embedded in Dutch university research. The Multimedia and Human-Computer Interaction group is renowned for its innovative work on all aspects of automated and semi-automated multimedia presentation authoring and presentation generation. Results of this work include the Amsterdam Hypermedia Model, contributions to the W3C SMIL 1.0, SMIL 2.0, and XHTML recommendations, the hypermedia authoring system GRiNS, and the CWI spin-off company Oratrix. Members of the group have been active in W3C's XHTML and SYMM Working Groups and ISO's MPEG7 DDL Working Group. Members of the group are currently participating in the W3C Semantic Web Best Practices group which aims to provide use-cases for developers of Semantic Web applications.

Role / contributions to EMMA:

- CWI will bring to the project its in-depth expertise in the combination of Semantic Web, adaptive hypermedia and multimedia database technology. This includes know how in the use of semantics-based representation of domain knowledge (in particular of the cultural heritage domain), (semi-) automatic hypermedia creation and presentation, adaptive user interfaces for personalised presentation and navigation.

- In particular, the group will work on mechanisms for the use and creation of semantic metadata at the user interface level; aspects of manual and semi-automatic semantic annotation during the authoring and automatic generation of cultural heritage items will be investigated. Related to these issues is the work on semantic-based presentation of multimedia.

- In the I2RP (Intelligent Information Retrieval and Presentation in Public Historical Multimedia) project, CWI is also currently exploring how individual multimedia objects from database queries can be related by placing them in the context of a unified hypermedia presentation. Results of this work will feed into the further R&D concerning appropriate rhetorical and narrative discourse structures, and their mapping onto hypermedia presentation patterns, for guiding the overall flow of a EMMA stories.

Selected EU and national projects

CWI was a partner in the EU-FP5 OntoWeb (Ontology-based information exchange for knowledge management and electronic commerce) project, and is currently involved in the FP6 digital libraries NoE DELOS, www.delos.info.

With respect to CWI's contributions to EMMA, results from the following ongoing or completed research projects carried out on the national level bear particular relevance. They cover

- *CHIME (Cultural Heritage in an Interactive Multimedia Environment):* use of semantic models for tailoring the presentation of cultural information extracted from existing repositories, http://homepages.cwi.nl/~media/projects/CHIME/

- *NASH (Networked Adaptive Structured Hypermedia)*: concentrates on improving structured adaptive hypermedia presentations on the Web, http://db.cwi.nl/projecten/project.php4?prjnr=143

- **I2RP** (Intelligent Information Retrieval and Presentation in public historical multimedia databases): concentrates on personalized, media-centric hypermedia-interfaces, http://db.cwi.nl/projecten/project.php4?prjnr=144

- **Cuypers** Multimedia Transformation Engine (prove-of-concept prototype for automatic generation of Web-based presentations as an interface to semi-structured multimedia databases), http://homepages.cwi.nl/~media/cuypers/; currently, a discourse-driven extension to Cypers is under development, http://www.ai.rug.nl/alice/i2rp/

- *Topia Demonstrator*: shows how a semantically rich multimedia database can be the basis for a 'storyline' that conveys the underlying relationships in the data (uses the Rikjsmuseum's aria database and a part of the Iconclass ontology), http://topia.demo.telin.nl/

Consiglio Nazionale della Recerche (CRN / Institute of Cognitive Science and Technology (ISTC) / Laboratory of Applied Ontology – Italy
Scientific and technical expertise

The ISTC, an autonomous institute of the Italian National Research Council (CNR), is the most important Italian research institution for Cognitive Science with more than 60 scientists involved in highly interdisciplinary research merging cognitive and social sciences, linguistics, artificial intelligence, and knowledge engineering. The ISTC's Laboratory for Applied Ontology (LOA) has acknowledged expertise in the ontological foundations of conceptual modelling, ontology analysis (e.g. OntoClean methodology), and the use of

ontology design methods and techniques in different fields such as knowledge engineering and representation, Semantic Web, database design, information retrieval, and natural language processing. On the application side, it is active in areas such as enterprise modelling, e-commerce, integration of lexical resources, and information extraction.

Role / contributions to EMMA:

- ISTC-LOA will act as a methodology partner and contribute its expertise in modelling and making use of ontologies. Particularly, this will be applied to cultural information resources in order to ensure the building of appropriate knowledge databases and semantic interoperability between information resources and tools.

- LOA will also contribute its libraries of foundational ontologies and ontology design patterns for improving the process of ontology building and their lifecycle. In particular, the reusable components for information objects and plan models developed on top of the DOLCE ontology (http://dolce.semanticweb.org) will be suited to the EMMA conceptual framework, since they can provide a solid foundational layer to cultural artefact description, story script formalization, and semantic social software development.

Selected EU projects

Besides many national projects (academic and industrial), the LOA has been part of several European research projects and networks such as:

- SemanticMining NoE - Semantic Interoperability and Data Mining in Biomedicine (FP6-IST, 2004-06), www.semanticmining.org
- METOKIS – Methodology and Tools Infrastructure for the Creation of Knowledge Units (FP6-IST, 2004-05, http://metokis.salzburgresearch.at),
- WonderWeb - Ontology Infrastructure for the Semantic Web (FP5-IST, 2002-04), http://wonderweb.semanticweb.org
- OntoWeb - Ontology-based information exchange for knowledge management and electronic commerce (FP5-IST, 2001-04), www.ontoweb.org,
- IKF - Intelligent Knowledge Fusion (EUREKA, 2000-04), www.ikfproject.com

The Open University / Knowledge Media Institute (KMI) – United Kingdom
Scientific and technical expertise

The Knowledge Media Institute (KMI), set up by the Open University in 1995, works at the leading edge of R&D in a convergence of areas that include: knowledge and learning systems & tools, semantic Web, multimedia technologies, and recent advances in narrative hypermedia and social software. KMI has many innovative applications to its credits, that demonstrate that it is beneficial to ground technological research & development in interdisciplinarity and authentic work contexts, with genuine user communities. The following tools may illustrate KMI's expertise in combining semantic and multimedia technologies, as relevant to EMMA: 'Scene Driver' supports the organisation of animation content into narratively coherent games; 'Community Story Exchange' uses knowledge level description to automatically structure a collaborative environment; the 'Story Fountain' environment supports the semantic exploration of a story archive. Besides these applications, we have also developed infrastructure tools that can be used within EMMA: Apollo was developed for the browsing and editing of ontologies (http://apollo.open.ac.uk) and the

Resource Annotation Tool (RAT) can be used for the annotation of arbitrary web pages using selected ontologies.

Role/contributions to EMMA:

KMI's contribution to EMMA will focus primarily on the following activities:

- support for meme representation and their use in the semantic search, retrieval, and organisation of heritage objects,
- support for the presentation and collaborative construction of discourse structures supported by their semantic annotation,
- incorporation of multimedia presentations into discourse structures, and versioning of multimedia presentations to capture their evolution within discourse structures.

Selected projects

KMI has been involved in many R&D projects on the national and EU-level, of which following bear particular relevance to EMMA's focus:

- **Tiny-In** - True Interactivity for Young Viewers of Virtual Broadcast Content via Intelligent Interfaces (EPSRC-DTI-LINK project, 2002 – 2005): concentrates on an interactive narrative engine for creating coherent and engaging experiences by intelligently recombining content.
- **CIPHER** - Communities of Interest Promoting Heritage of European Regions (FP5, 2002-04, co-ordinated by KMI): the project developed methodologies and advanced storytelling & visualisation tools for Cultural Heritage Forums that collect and share cultural knowledge;
- **CLOCKWORK** - Creating Learning Organizations by means of Contextualized Knowledge-Rich Work Artefacts (FP5, 2000– 03, co-ordinated by KMI),

University of Twente / Centre of Telematics and Information Technology / Human Media Interaction (HMI) – Netherlands
Scientific and technical expertise

The Centre of Telematics and Information Technology (CTIT) of the University of Twente is conducting multi-disciplinary research in ICT systems and applications. Its Human Media Interaction (HMI) group specialises in multimodal interaction, multimedia access and presentation technologies, and smart interfaces. With respect to EMMA, particularly HMI's expertise in IT-based interpretation of interaction behaviour, annotation tools, multimedia indexing, models for information fusing, dialogue systems, language processing and summarization may be highlighted. HMI has proven its expertise in many nationally and EU-funded research projects, and has been working with both technology providers and content owners such as broadcast archives and publishers. Whenever appropriate, performance evaluation is done through participation in international benchmarks for information processing such as TREC, CLEF, TRECVID and TDT Evaluations.

Role/contributions to EMMA:

UT/HMI will bring its experience with discourse modelling and narrative structures to the project and will be responsible for the overall design of the User Agent in EMMA.

Selected projects

HMI participated in EU research projects from the 4th to the 6th Framework Programme involving multimedia indexing, search & retrieval, and advanced interaction environments:

- FP4 TAP: OLIVE, POP-EYE and TWENTYONE,
- FP4 IST: ECHO and MUMIS,
- FP5 IST: Multimodal Meeting Manager (M4)
- HMI has been and is currently involved EU research networks: DELOS NoE (Digital Libraries), ELSNET (Language and Speech Processing); FP6: INTUITION NoE (Virtual reality); FP6: HUMAINE NoE (Human-Machine Interaction); FP6: HMI is also associated member the SIMILAR NoE (Multimodal Interfaces)
- On the national level, HMI's participation in the large-scale, interdisciplinary MulitmediaN project that joins leading research groups from universities, major industry players (Philips, IBM), and over twenty high tech industrial partners and content institutions (e.g. Van Dale Lexicografie and Nedelands Instituut voor Beeld en Geluid) in RTD and demonstration in multimedia-based information exchange and interaction, including pictures, video, and sound.

PRC Group – The Management House - Greece
Scientific and technical expertise

The PRC Innovation Business Unit specializes in the conceptualisation, design and implementation of Internet applications capable of handling complex content and supporting highly segmented user needs and interests. It has proven expertise in information architectures, usability evaluation and design, structured document design and content management using XML. Furthermore, PRC Group's solutions often integrated knowledge organisation using controlled vocabularies, thesauri and topic hierarchies. Application domains include corporate communication portals, electronic media offices, web archives, and exhibition environments. Of particular relevance to EMMA will also be PRC Group's significant expertise in the field of cultural communication and documentation as demonstrated in relevant projects (see below).

Role/contributions to EMMA:

The PRC Group will contribute to EMMA in the following areas:

- The area of analysis of diverse user perspectives/needs, and their impact/relationship with domain knowledge organisation.
- The development of application metaphor and user scenario(s).
- Visual and interactive design of the application(s), as well as interface development
- Implementation and deployment of solution(s) and service provision
- Dissemination work by establishing ways according to which the progress and results of the project can be best communicated.

Selected projects

- CALIMERA - Cultural Applications: Local Institutions Mediating Electronic Resource Access FP6-IST, Coordination action, 2003-05), www.calimera.org; PRC role: technical work leader, usability guidelines, organisation of CH-industry pool)
- SALIDAA - South Asian Arts and Literature Digital Archive (UK NOF-Digitise project), www.salidaa.org.uk, in partnership with Adlib Information Systems; hierarchical and subject-based Web access to heterogeneous cultural archive

information (compatible with standards such as Spectrum, ISAD (G), EAD and Dublin Core)

- Selected recent industry projects: Knowledge portal for the Greek Ministry of Development's EPAN, 'Competitiveness' Programme, www.antagonistikotita.gov.uk; redesign of the Web portal of the COSMOTE, Greece's leading mobile telecommunication company.

- In addition, experience in development work with blue chip enterprises such as TMI International or Antenna Media Group may be interest for demonstration and exploitation activities.

University of Art and Design Helsinki (TaiK) / Media Lab - Finland
Scientific and technical expertise

The University of Art and Design Helsinki (TaiK) educates and researches in the fields of art, design, audio-visual communication, interactive media design and production. Of particular relevance to EMMA is TaiK's R&D expertise proven by the Media Lab faculty and the Media Centre LUME in many projects, including several recent EU-sponsored IST projects. These included interdisciplinary and participatory designs, tools and interfaces, particularly also for heritage organisations and their user communities. For example, the CIPHER Soft Ontology Layer Tool for artefact description and information visualisation based on Self Organising Map technology, and the ImaNote (Image and Map Annotation Notebook), that allows a group of people to online add annotations and links to digital images.

Role/contributions to EMMA:

The Media Lab team will bring to EMMA its experience in the application of user-centred participatory design methods for IT development in the cultural heritage sector. This will include the iterative use of scenarios, models, and prototypes for user interface and application development. In addition, the group will develop guideline and requirement specifications as well as interface metaphors to suit the needs of the targeted EMMA user communities.

With respect to user validation, the team will participate in defining EMMA evaluation procedures at multiple levels and in diverse stages of the components development cycles. In addition, it will conceive instruments and organise usability evaluations for the EMMA tools and integrated application (with respect to the end-user's environments such as discourse forums).

Selected projects

- **POLKU** (2005–2006), Finnish design research project on interactive, distributed art work that makes use of mobile device technology, signage billboards, and 3D stereographic displays, to engage the viewer in a narrative.

- **Map of Mexico** 1550 (1997-2006), collaborative research and demonstration project of TaiK's Media Lab and the Helsinki University of Technology, Dept. of Photogrammetry, targeted at contextualising the Map (digital replica) through online annotations and links, http://church.uiah.fi:9673/edam/)

- **CIPHER** - Communities of Interest to Promote Heritage of European Regions (FP5-IST, 2002-04), Media Lab focus: information organisation and navigation tools; http://cipher.uiah.fi

- **E-Culture Net** (FP5-IST, Thematic Network, 2002-2003), focus: European digital culture research and education, 35 partners from 17 countries, http://sysrep.uiah.fi/e_culture

Tel Aviv University, The Porter Institute for Poetics and Semiotics (TAU) - Israel

Scientific and technical expertise

The Tel Aviv University's Porter Institute for Poetics and Semiotics, directed by Prof. Ziva Ben-Porat, was founded in 1975. The Institute is the home base of leading researchers in Cognitive Linguistics, Narratology, Semiotics (sign theories), Literary and other Cultural Studies.

Representative of the Institute's scope are the publications: 'Poetics Today' – an international quarterly journal in English, published and distributed by Duke University Press; and 'Literature / Meaning / Culture' – a book series in Hebrew dedicated on these topics.

The Institute emphasis empirical studies and, increasingly, the use of advanced computer technologies in the analysis of cultural expressions.

Also of particular relevance with respect to EMMA, is the special experience of the Institute in narratological analysis, relationships between different cultural expressions, cultural canons, relationships between popular and 'high' culture.

The Institute and senior researchers have also already participated in EU-funded IST projects (see below).

Website: http://www.tau.ac.il/humanities/porter/

Role/contributions to EMMA:

In EMMA, TAU will participate in preparing the ground for computer/Web-based capturing, analysis and processing of cultural expressions, through

- developing a conceptual framework for, and parts of, a taxonomy of cultural memes,
- analysing narrative patterns in Web-based stories and conversations,

Selected EU projects

- **CULTOS** - Cultural Units of Learning, Tools and Services: 2001-2003; focus: knowledge-aware multimedia authoring and presentation tools; TAU tasks: ontological modelling of inter-textual relationships, cultural case studies; TAU senior researchers: Prof. Z. ben Porat, Dr M. Benari; www.cultos.org
- **METOKIS** – Methodology and Tools Infrastructure for the Creation of Knowledge Units: 2004- 2005; carrier architecture for task-related knowledge-content objects; http://metokis.salzburgresearch.at Note: in METOKIS, TAU involvement is through participation Dr Motti Benari who is currently (temporary) employed by Salzburg Research to carry out ontological analysis and case studies.

Selected publications:

- Benari, M. et. al. (2004): The Intertextual Thread: A new Cultural Unit in Hypertext In: Leonardo Electronic Almanac. vol. 12, no. 9, September 2004, ISSN #1071-4391.
- Ben-Porat, Z. (2003): Cultural Memory, Cultural History, and Cultural Canons in the Third Millennium, in: Arcadia 38:2 (Special Issue: Cultural History: Straddling Borders), (339-342), http://www.degruyter.de/journals/arcadia/arcadia38_2.html

- Ben-Porat, Z., Behrendt, W., Reich, S. (2002): Organizing multimedia intertextual knowledge. New tasks, challenges and technologies In: ALLC/ACH 2002. New Directions in Humanities Computing. The 14th Joint Intl. Conference, Tübingen 2002, pages 8-11.

Helsinki University of Technology (TKK) / Semantic Computing Research Group (SeCo) – Finland

Scientific and technical expertise

The TKK Semantic Computing Research Group (SeCo) is the first and largest research group in Finland focusing on research on ontologies and the Semantic Web. SeCO conducts research projects at the TKK/Laboratory of Media Technology, University of Helsinki (Computer Science), and Helsinki Institute for Information Technology. The SeCo group is internationally known for having created the semantic portal MuseumFinland, which was launched in 2003.

SeCo is also currently directing the national Finnish ontology project FinnONTO (2003-2007), financed by the National technology agency Tekes and 26 companies and public organizations (volume 0.8M€/ year). FinnONTO's goals include creation of large national cultural ontologies and metadata conforming to them based on museum collections, cultural databases, and other sources of cultural heritage information. This content will be available on the Web in a new semantic portal that is being developed based on MuseumFinland.

Role/contributions to EMMA: TKK contributes to EMMA in three ways:

Tool provider

SeCo group has created a number of tools, such as OntoViews framework for creating semantic web portals. Successful applications of the tool include MuseumFinland and Orava (http://ww.museosuomi.fi/orava), a semantic portal for searching video clips, whose metadata conforms to the Learning Object Metadata (LOM) format, and whose content has been semantically linked with MuseumFinland RDF(S) based collection content. Also tools for transforming database contents into RDF(S) and OWL have and are being created. These tools provide a basis on which some parts the EMMA demonstration systems could be build, potentially in all EMMA objective areas.

Semantic representation

SeCo currently conducts research on semantic representation of narratives, semantic content integration, semantic search and browsing, representation of ontological change, geo-spatial reasoning, uncertainty in ontologies, and ontology mapping. In EMMA, SeCo will contribute especially in the fields of semantic representation of narratives and semantic content integration.

Content access provider:

FinnONTO consortium and its partners expressed their interest in participating in EMMA through the TKK as a content provider. Conditions for publishing the materials will be negotiated by the content owners after selecting the needed contents. FinnONTO project is based on Open Source licensing and the idea of open content publishing on the web. - The FinnONTO consortium currently contains the following content providing organizations from the cultural heritage and related domains:

Museums and galleries: • The National Board of Antiquities, including e.g. the National Museum; • The Antikvaria-group of some 20 major museums; • The Kiasma-museum

(modern art); • The Finnish Museum of Photography; • The Finnish National Gallery; • The Finnish Agriculture Museum; • Espoo City Museum;
Libraries: • The National Library of Finland; • The Helsinki City Library; • The Finnish Literature Society;
Related organisations: • The National Broadcasting Company YLE; • m-cult.org

Selected projects

The most relevant projects with respect to EMMA are the Semantic portal MuseumFinland (developed in 2002-2004), and the FinnONTO - National Ontology Project in Finland (2003-2007), which will closely interlink with the planned research & development, testing and validation work within EMMA.

InterSoft a.s. - Slovakia

Scientific and technical expertise

InterSoft has proven expertise in the development and application of knowledge technologies such as knowledge modelling tools, knowledge management, agents, data mining and retrieval applications. The members of the software development teams possess have professional experience with various platforms, software development environments, Java technologies, database systems, networking and distributed programming. Staff members have participated in several international EU-funded R&D projects (see below), and have delivering software solutions for companies in Europe (Finland, Germany) and the USA.

Two exemplary systems and tools may illustrate InterSoft's R&D expertise: • KnowIT!: a software suite that supports decision processes, intelligent data search considering contextual dependences, and extraction of implicit knowledge from heterogeneous information sources. Advanced techniques employed include conceptual representations, heuristics, planning and scheduling algorithms, partially neural networks.

- **Webocract**: A complex information system for e-Government and e-Democracy that increases efficiency and transparency of the communication process between citizens and institutions. Modularity and specific interface using knowledge technologies and conceptual organization models allows for independently maintaining, changing and customizing the content.

Role/contributions to EMMA:

- Contribution to the project in the form of knowledge and experiences in the area of knowledge technologies including, for example, conceptual representation, intelligent data search considering contextual dependences, and extraction of information from heterogeneous heritage information sources.

- Software development concentrating on the components: Search, retrieval and contextualisation, User agent and related Interfaces.

- With respect to the combination and integration of semantic technologies and cultural information services, transfer of expertise in public administrative services as developed in e-government/administration and citizen applications.

Selected projects

- FP6: Access to e-Government Services Employing Semantic Technologies (Access-eGov), focus: semantic interoperability among e-government services across organisational, regional and linguistic borders.

- FP5-IST: Web Technologies Supporting Direct Participation in Democratic Processes (Webocracy), focus: effective systems for providing secure and user-friendly tools, working methods, and support mechanisms for information exchange between citizens and administrations.
- FP4-Esprit: Web in Support of Knowledge Management in Company (KnowWeb), focus: KnowWeb Toolkit for business innovators of knowledge-intensive organisations
- FP4-Esprit: Enriching Representations of Work to Support Organisational Learning (ENRICH), focus: methodologies and tools for integrating working and learning within knowledge-rich organisations, knowledge modelling, software agents and humans-base collaboration.
- Interactive Institute / Visions for Museums (V4M) - Sweden

Scientific and technical expertise:

The Interactive Institute is an experimental IT-research institute which creates results through combining culture and technology. The Institute consists of ten different research groups, distributed around Sweden. One of them is Visions for Museums V4M set up in 1999, http://www.tii.se/v4m.

The Interactive Institute through the V4M research group explores the ways in which digital technologies can develop and enhance on-site and online visitor interaction within museums of art, culture, history and science as well as at heritage sites (e.g. archaeological). V4Ms aims at being a centre of interdisciplinary research and practice regarding unser-oriented ICT and new media.

Role in / contributions to EMMA:

The V4M unit of the Interactive Institute will contribute to EMMA mainly in the following four ways:

- Trial EMMA prototypes in the framework of an exhibition at a museum and on its website. The Stockholm City Museum is strongly interested to become a lead user of the EMMA application (see: Letter of Support). The Museum has expressed its interest to pilot EMMA technologies in the framework of a major exhibition.
- Participate with end users in a larger field experiment in which the EMMA Social Discourse Forums will be tested.
- Disseminate information about the EMMA project and its results in Sweden and beyond (i.e. through the Institutes various international networks and collaborations).
- Present Demo Versions of EMMA results to interested IT-service companies (Application Service Providers) and heritage institutions in Sweden (for example, in the framework of the NODEM - Nordic Digital Excellence in Museums annual conference).

Selected projects:

V4M has the following lines of activities that circle around the interaction of users with IT-enhanced CH exhibitions:

- *Special research & development on "Digital media in the hands of visitors"*: Research project on the physical, cognitive and affective outcomes of digital media interpretation in museums and galleries. In collaboration with The Stockholm Institute of Education.

- *Interactive installations in museums:* For example, 'Historiehuset" - Conceptual development of an interactive imaging installation at Jamtli, the cultural historical museum of the county of Jämtland; 'Unga ingångar' (Young Entries): Collaboration and exhibit project with Liljevalchs Art Gallery, Stockholm and the university of Stockholm, regarding young people, digital media and interpretation of contemporary art.

- *Interaction with exhibits via mobile/handheld devices:* For example, Mölndal digital guide: evaluation and visitor study of users interacting with handheld, wireless multimedia guides at the museum of Mölndal, Sweden.

- *NODEM - Nordic Digital Excellence in Museums (organised by V4M)*: The annual Nordic forum and award for digital museum installations and interactives. NODEM was initiated by V4M in 2003, in collaboration with the Nordic museums associations and with financial support by the Nordic Cultural Fund and the Nordic Council of Ministers (www.tii.se/v4m/nodem).

- *Special training courses*: "New Media, visitors and exhibitions"; a four week study course at the University College of Film, Radio, Television and Theatre, Stockholm, Sweden

Project Resources

Total Costs for EMMA

The duration of the project is 36 months with an envisaged effort of **588** person months and total costs of **EUR 5.001.348** The requested funding from the EU is calculated at **EUR 3.252.680**

Project Management Costs

The project management costs amount to **EUR 446.905** This represents **4.8%** of the overall personnel effort (28 person months) and **8.94%** of the total budget. Technical co-ordination will be led by a Key Senior Researcher to guarantee achievement of the project's objectives. The figures are based on our experience in coordinating RTD projects in FP5 and FP6.

Personnel Costs

The total personnel costs amount to **EUR 4.526.948** This includes the total labour costs of the eleven partners, calculated according to the planned effort as outlined in the work plan.

Table 1 Breakdown of Personnel Costs

EMMA Consortium			Person Months			Personnel Costs			Total Costs	
No.	Acronym	Cost Model	Mgmt	RTD & Innov	Demo	Mgmt	RTD & Innov	Demo	Total Costs	Requested Grant Funding
1	SRFG	FC	18,00	102,00	6,00	€178.254	€1.010.106	€59.418	€1.247.778	€704.103
2	CWI	FC	1,00	46,00	1,00	€8.463	€389.298	€8.463	€406.224	€206.074
3	CNR	FC	1,00	50,00	3,00	€8.330	€416.475	€24.989	€449.793	€225.313
4	KMI	AC	2,00	54,00	4,00	€12.500	€337.500	€25.000	€375.000	€375.000
5	UT	FC	1,00	37,00	2,00	€12.000	€444.000	€24.000	€480.000	€242.400
6	PRC	FC	1,00	42,00	6,00	€9.300	€390.600	€55.800	€455.700	€224.130
7	TaiK	AC	1,00	44,00	3,00	€4.177	€183.797	€12.532	€200.506	€200.506
8	TAU	AC	1,00	53,00	2,00	€4.831	€256.032	€9.662	€270.524	€270.524
9	TKK	AC	1,00	31,00	4,00	€6.151	€190.687	€24.605	€221.443	€221.443
10	IS	FC	1,00	39,00	5,00	€2.700	€105.300	€13.500	€121.500	€60.075
11	TII	FC	1,00	22,00	3,00	€11.480	€252.560	€34.440	€298.480	€149.814
	Total		29,00	520,00	39,00	€258.186	€3.976.355	€292.407	€4.526.948	€2.879.382

Travel and Subsistence

The travel and subsistence costs are in support of the following activities.

- Management Activities
- A total of eight consortium meetings for overall project management and evaluation, consisting of: two four-day meetings, four three-day meetings, and two two-day meetings.
- The coordinator will also reserve a total of three one day meetings for quality control.
- RTD Activities
- A total of three one-day meetings for all partners for component integration and testing of research and technical developments.
- Innovation Activities
- All partners are asked to participate in three one-day conferences as part of overall development and awareness raising activities.

- Demonstration Activities
- Two one-day EMMA Road show events for the partners SRFG, Intersoft, IT, and PRC Group as part of the take-up actions of the project as illustrated in the workplan below.

Table 2 Breakdown of Travel & Subsistence Costs

EMMA Consortium			Travel & Subsistence				
No.	Acronym	Cost Model	Mgmt	RTD & Innov	Demo	Total Costs	Requested Grant Funding
1	SRFG	FC	€17.480	€7.440	€2.480	€27.400	€22.068
2	CWI	FC	€13.760	€7.440	€0	€21.200	€17.480
3	CNR	FC	€13.760	€7.440	€0	€21.200	€17.480
4	KMI	AC	€13.760	€7.440	€0	€21.200	€21.200
5	UT	FC	€13.760	€7.440	€0	€21.200	€17.480
6	PRC	FC	€16.960	€9.840	€3.280	€30.080	€23.028
7	TaiK	AC	€16.960	€9.840	€0	€26.800	€26.800
8	TAU	AC	€10.080	€6.120	€0	€16.200	€16.200
9	TKK	AC	€16.960	€9.840	€0	€26.800	€26.800
10	IS	FC	€13.760	€7.440	€2.480	€23.680	€18.348
11	TII	FC	€8.480	€4.920	€1.640	€15.040	€11.514
	Total		€155.720	€85.200	€9.880	€250.800	€218.398

Subcontracting

- A trial will be conducted by researchers attached to Department of Communication, Media and Culture at Panteion University under the direction of Dr. Yannis Scarpelos of the EMMA tools for a total cost of **EUR 5.000**, to cover the costs of installation, system maintenance and running the trials. See Annex 3 for further details
- SRFG as coordinator will appoint a group of *4* external peers of high professional standing in the fields addressed by EMMA, to review key deliverables and to comment on their view of overall progress made in the project. There will be a fixed sum of 1500 Euro per reviewer, for expenses, bringing a total cost of **EUR 6.000**. See page55 for further details

Durable Equipment

Overall costs of **EUR 48.000**. Assuming serves for the application cases and workstations for the developers. Depreciation is calculated over three years.

Table 3 Breakdown of Durable Equipment Costs

EMMA Consortium			Durable Equipment	
No.	Acronym	Cost Model	RTD & Innov	Requested Grant Funding
1	SRFG	FC	€10.000	€5.000
2	CWI	FC	€2.000	€1.000
3	CNR	FC	€2.000	€1.000
4	KMI	AC	€8.000	€8.000
5	UT	FC	€4.000	€2.000
6	PRC	FC	€2.000	€1.000
7	TaiK	AC	€4.000	€4.000
8	TAU	AC	€4.000	€4.000
9	TKK	AC	€6.000	€6.000
10	IS	FC	€6.000	€3.000
11	TII	FC	€0	€0
	Total		€48.000	€35.000

Consumables

Overall cost of **EUR 69.000**. We assume **EUR 100** per person month for client side software. In addition, server software is estimated at **EUR 3.000** per allocated server.

Table 4 Breakdown of Consumables Costs

EMMA Consortium			Consumables	
No.	Acronym	Cost Model	RTD & Innov	Requested Grant Funding
1	SRFG	FC	€13.800	€6.900
2	CWI	FC	€3.600	€1.800
3	CNR	FC	€3.600	€1.800
4	KMI	AC	€10.200	€10.200
5	UT	FC	€7.200	€3.600
6	PRC	FC	€3.600	€1.800
7	TaiK	AC	€7.200	€7.200
8	TAU	AC	€7.200	€7.200
9	TKK	AC	€6.600	€6.600
10	IS	FC	€6.600	€3.300
11	TII	FC	€0	€0
	Total		€69.600	€50.400

Other Costs

The sum of other costs totals **EUR 95.000**. This includes protection of knowledge, networking, EU project marketing and costs for audits. A total budget of **EUR 50.000** is also allocated to the organisation and running of an EMMA Conference as part of the innovation related activities to promote awareness and take-up of the scientific and technological results of the project.

Table 5 Breakdown of Other Costs

EMMA Consortium			Other Costs			
No.	Acronym	Cost Model	Mgmt	RTD & Innov	Total Costs	Requested Grant Funding
1	SRFG	FC	€3.000	€62.000	€65.000	€34.000
2	CWI	FC	€3.000	€0	€3.000	€3.000
3	CNR	FC	€3.000	€0	€3.000	€3.000
4	KMI	AC	€3.000	€0	€3.000	€3.000
5	UT	FC	€3.000	€0	€3.000	€3.000
6	PRC	FC	€3.000	€0	€3.000	€3.000
7	TaiK	AC	€3.000	€0	€3.000	€3.000
8	TAU	AC	€3.000	€0	€3.000	€3.000
9	TKK	AC	€3.000	€0	€3.000	€3.000
10	IS	FC	€3.000	€0	€3.000	€3.000
11	TII	FC	€3.000	€0	€3.000	€3.000
	Total		€33.000	€62.000	€95.000	€64.000

Spec. targeted research project

[EMMA]

STREP Project Effort Form

Full duration of project

(insert person-months for activities in which partners are involved)

Project acronym - EMMA

	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII	TOTAL PARTNERS
Research/Innvoation activities												
Search, Retrieval, Memes and Contextualisation	24	6	12	13	5	2	4	18	11	6	0	10
Multimedia and semantics enabled story construction	13	27	16	6	3	0	0	10	6	6	0	8
Semantic Social Software Component	34	8	12	24	18	14	0	12	0	12	0	8
User Requirements, Interfaces and User Validation	15	3	6	3	2	17	29	5	4	6	12	11
Field experiments with users	9	0	0	4	4	4	8	5	7	5	6	11
Dissemination and exploitation	7	2	5	5	5	6	3	3	3	4	4	11
Total research/innovation	**102**	**46**	**51**	**55**	**37**	**43**	**44**	**53**	**31**	**39**	**22**	

	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII	TOTAL PARTNERS
Demonstration activies												
Demonstration Phase	6	1	2	4	2	5	3	2	4	5	3	11
Total demonstration	**6**	**1**	**2**	**4**	**2**	**5**	**3**	**2**	**4**	**5**	**3**	

	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII	TOTAL PARTNERS
Consortium management activities												
Project Management	18	1	1	1	1	1	1	1	1	1	1	11
Total Management	**18**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	**1**	

| **Total Activities** | 126 | 48 | 54 | 60 | 40 | 49 | 48 | 56 | 36 | 45 | 26 | |

Total Personnel Months	588

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B.4.1 Sub-contracting

A small subcontracting budget of **EUR 11.000** is allocated to SRFG for user trials and for external peer review support.

User Pilot

It is intended to use participant observation methods to capture how students' use the EMMA tools in practice. In order to provide qualitative feedback for interface and interaction improvements, the pilot should allow for a good understanding of how the tools are framed and understood by the users themselves. Participants will be second or third year students supervised by researchers of the Laboratory. The pilot will be organised according to the specifications in EMMA work package 5: T5.4: User testing & validation plan. The plan will specify goals, required settings and contexts, methods, metrics, schedules, and templates for reporting the results. Total cost of the exercise is **EUR 5.000** for the installation, maintenance and running of the user pilot.

External Peers Experts

SRFG as coordinator will appoint a group of *4* external peers of high professional standing in the fields addressed by EMMA, to review key deliverables and to comment on their view of overall progress made in the project. Their assessments will be done in Months 9 (first results), 18 (first prototype), and 27 (shortly before the end of the technical development phase), so as to allow the consortium to rectify problems should they arise. There will be a fixed sum of 1500 Euro per reviewer, for expenses, which represents a total cost of **EUR 6.000**

B.4.2 Other countries

Not applicable in this project

B.5 Project management

EMMA Project management organisation

The EMMA project management structure consists of four elements: the project coordinator (PC), the scientific-technical management core team (STM Core Team), the partner organisations (P) each appointing one administrative (AM) and one scientific-technical manager (STM), and a group of external reviews for quality assurance (External QA). On part of the European Commission, the project officer will be our primary contact.
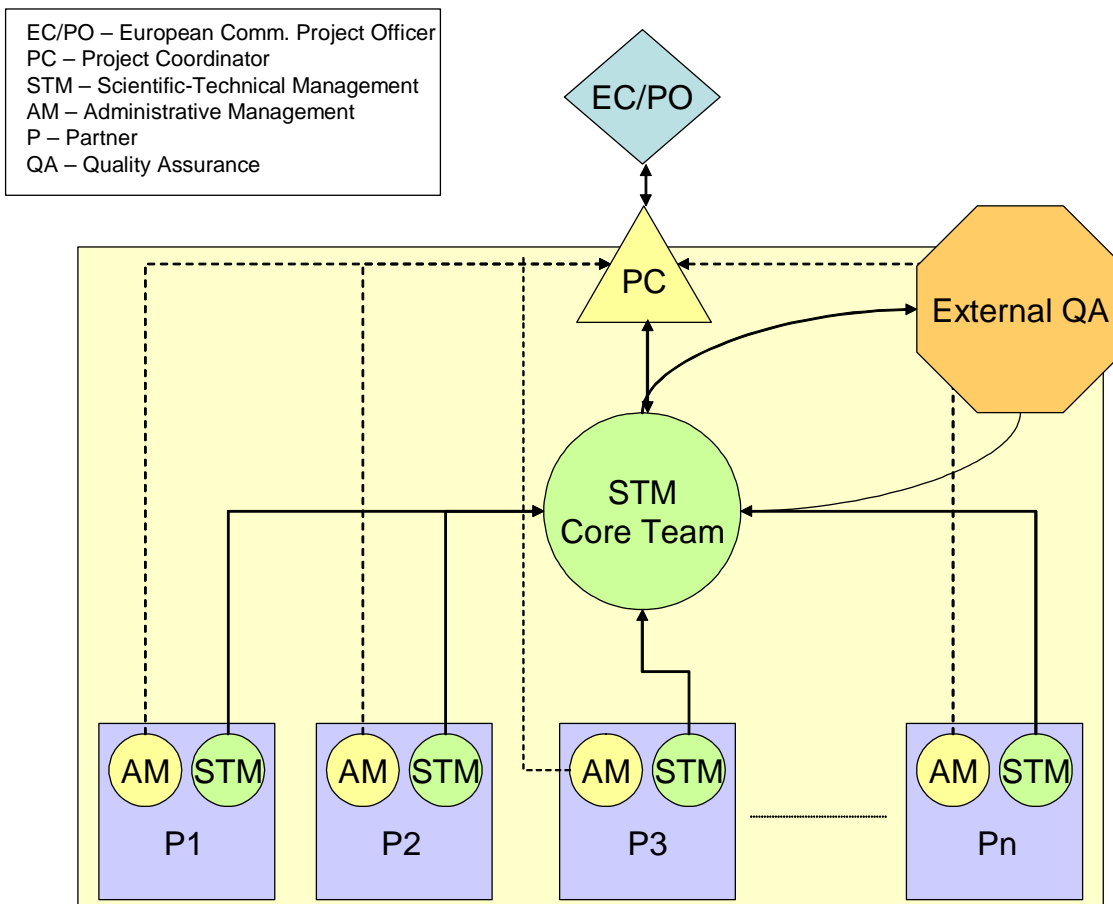
Project coordinator

Salzburg Research (SRFG) will function as the coordinator of this project. Founded in 1995, Salzburg Research Forschungsgesellschaft has managed and co-ordinated a series of EU technical, dissemination and socio-economic projects and hence, brings to the project in-depth management know how. In its role as co-ordinator of the project, Salzburg Research will be responsible for all technical and administrative matters related to the management of the project.

The *technical co-ordination* will encompass work-package and task co-ordination, work plan maintenance, monitoring of project progress, identification and trouble shooting of technical or organisational problems. The technical project management will pay particular attention to the co-ordination of timely production of deliverables and the quality control against technical

and contractual aspects. Its role is to monitor the project objectives and to devise remedial action in case of work plan deviations.

The *financial and administrative coordination* includes:

- (financial, personnel, material) resource planning, monitoring and controlling;
- liaison between EC officials, external experts and consortium members;
- co-ordination of meetings and progress reviews;
- production and consolidation of periodic external reports, including bi-annual cost statements.
- Finally responsible for internal quality assurance (final veto)

Salzburg Research will delegate the operational responsibility to the STM Core Team, which will supervise the work in the individual work packages with regards to milestones and project objectives. All strategic decisions concerning a successful project course will be made in this group. Furthermore, in the initial project phase, each consortium member will name a person responsible for the day-to-day technical and administrative work, i.e. cost statements, input for internal and external report, scheduling of appointments and meetings, etc.

Project scientific-technical management – STM Core Team

There will be a core team consisting of senior managers from SRFG, CWI, KMI, TAIK, TAU, CNR and PRC who will consult on critical and/or longer term scientific and technological issues. This group will hold frequent telephone or video conferences to inform each other on the progress made in core questions of EMMA.

In addition, each partner will also appoint one administrative contact to report directly to the project coordinator with regards to all administrative issues.

External quality assurance

SRFG as coordinator will appoint a group of *4* external peers of high professional standing in the fields addressed by EMMA, to review key deliverables and to comment on their view of overall progress made in the project. Their assessments will be done in Months 9 (first results), 18 (first prototype), and 27 (shortly before the end of the technical development phase), so as to allow the consortium to rectify problems should they arise. (There will be a fixed sum of 1500 Euro per reviewer, for expenses.)

Internal Quality assurance procedures

From prior experience in EU-project management, the two factors that put a project into jeopardy are deviations from schedule and unsatisfactory quality of work. To ensure that project partners deliver in time and according to the expected quality level, Salzburg Research has developed a *Quality Assurance and Self-Assessment Handbook* that formulates procedures for quality assurance and risk management in EU-projects.

The Handbook covers the assignment of responsibilities, project reporting procedures and standards covering monthly management and personnel planning reports (forward looking), bi-monthly management reports, bimonthly research notes (monitoring research progress), technical management procedures, timing and tracking of deliverables at different stages

(work in progress, drafts, final deliverables), as well as procedures for research, technical and software quality assurance.

For example, with regards to the timing of work in progress, drafts, and final deliverables, the QA-Handbook establishes the following procedure:

- *A detailed deliverable plan issued by the party responsible for the deliverable, and extending the original task brief must reach the coordinator 3 weeks after the start of the task in which the deliverable "lives".*
- *A work-in-progress report of the deliverable must reach the QA mentor and the coordinator 6 weeks before the deadline. Any w-i-p deliverable failing to appear 4 weeks before the deadline will officially delay the deliverable by one month and project planning will be revised accordingly.*
- *A draft deliverable must reach the QA mentor and the coordinator 3 weeks before the deadline. Any draft failing to appear 2 weeks before the deadline will officially delay the deliverable by one month and project planning will be revised accordingly.*
- *The sign-off criteria of each deliverable will depend on the specific nature of the deliverable and will be agreed as part of the collective planning.*

Adherence to the standards as defined in the Quality Assurance Handbook will be expected by all partners participating in EMMA.

Communication flow

Communication flow within the consortium relies on regular meetings and internal reports (transmitted via electronic media). Meetings will be organised by the project coordinator (PC), according to the needs of the project. The PC will be responsible to submit in time an agenda and provide the meeting minutes for comments and approval of the attendants.

The project will use a web-based project collaboration platform hosted by SRFG. This platform has already been in use for several projects and is continually developed via a strategic partnership between SRFG and the vendor company. There will be an email logging and archiving system in place. Regular telephone and video conference facilities will also be provided by SRFG.

Reporting

The current Framework Programme on the one hand, honours the need for good project management by refunding it at 100%, yet at the same time, it requires the contractors to employ highly efficient management structures as only 7 percent of project cost can be refunded this way. Recent experience has shown that audit cost alone accounted for up to 20% of the allocated management monies, decreasing the level of actual management funding further. Therefore, a lean, yet effective management reporting organisation is needed. Another problem is that current practice allows up to 45 days grace for the delivery of management reports which means that the project officer can be two months out of date with respect to actual state of the project.

Intended as an early warning system and as a means to recognise project deviations at an early stage, we will therefore propose the following reporting model:

1. Monthly INTERNAL effort/cost reporting from each partner to the coordinator, using predefined Excel spreadsheet;
2. Monthly INTERNAL staff research reports from each research partner to the coordinator;
3. Constant monitoring of activity on the electronic project platform by the coordinator;
4. Regular, pro-active reporting of work package leads to coordinator in accordance with assigned deliverables, deadlines and work dependencies;
5. Six-monthly scientific, technical, and resource spend report ("virtual cost statement")

Using this reporting mechanism, the project coordinator will be able to provide the EC Project Officer, on request, with information on the current status of the EMMA project (maximum delay of one month which is needed to aggregate the report from partners.)

With regards to all technical and management reports, the PC may request clarification by individual partners, if he feels that the progress report is unclear or insufficiently justified by the previous management reports. If the PC deems the explanations provided by a partner not satisfactory, he may reject the cost-statement and ask for a revision.

Finally, the PC is also responsible for producing the annual report on request from the EC.

Technical decisions

Technical issues which appear during project life and have an impact on the work of several partners are discussed primarily through an archived mailing-list. All partners may launch a new discussion thread for discussing a technical issue and propose one or several possible solutions. In case of disagreement between partners, the PC may propose a solution, and/or organise a straw-vote of all partners by e-mail. In case of persistent disagreement, a partner has a right to raise the issue at the next meeting of consortium.

Budget re-allocation and other key decisions

All key decisions and notably budget and tasks re-allocations must be approved by the STM Core Team. In case a vote is needed, each contracting partner attending the meeting has one vote. A partner may delegate to a proxy through a written and signed proxy delegation (fax accepted). The PC chairs the meetings and produces the minutes.

Conflict management procedures

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. Non-technical factors such as re-source allocation and contractual terms will also need to be agreed and documented in writing.

The workpackage leaders will immediately inform the co-ordinator if potential conflict situations arise. 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 discussed/solved on the STM Core Team level. Decisions will be made by majority vote of all principal and assistant contractors.

In the case of a tie the project co-ordinator has two options. Option 1 is to make use of his decisive vote right. Option 2 is to call a meeting of the STM Core Team within four weeks. In the project Core Team, a decision needs to be reached with majority vote of the workpackage leaders of the principal contractors and the project co-ordinator. In the case of a tie again (equality of votes) the vote of the project co-ordinator will decide. As is the case with all critical decisions, the PO will be informed in due time of the issues and decision options available.

The project Core Team has the explicit right to change budgets and workloads during the course of the project and to have a principal contractor or assistant contractor expelled from the consortium. Any changes regarding budget/contractual issues (hard and soft contract amendments) need the agreement of the EC.

Risk management

We distinguish generic project risks (GEN) and specific risks. The Quality Assurance Handbook covers procedures concerning generic risks (e.g., risks pertaining to unstable staff resources, risks due to the project time line, risks pertaining to insufficient understanding of the market needs, etc.,). The specific risks are related to either to the consortium (CON) and its partner set-up or the work plan and its task dependencies (DEP), or indeed, are scientific (SCI) and technological (TEC) risks. The following is an initial risk assessment which will be revisited and supplemented if the project gets funded:

At this stage, we perceive the following critical issues specific to the research issues of EMMA:

RISK	RISK-Type	Contingency Plan
Consortium is relatively large for a STREP	CON	All core partners have long-standing experience and an excellent track record in RTD projects of all sizes. The project management structure balances number of participants vs. effective decision making, through the core management group.
The partners use different development and research infrastructures (e.g. KMI: LISP based, CWI: Prolog based, SRFG: Java/RDF based)	SCI TEC	We will devise a distributed service oriented architecture which "hides" the implementational differences and focuses on a knowledge-based abstraction layer for semantic interoperation. The set-up offers also an opportunity for the exchange of expertise between strong technical teams.
Build a proof-of-concept prototype of a distributed information system that can handle self-descriptive objects containing explicit knowledge, meta data and multimedia data.	SCI	Constant dialogue with communities involved in building web-based distributed information systems (e.g. DIP - semantic web services)

Consortium agreement, intellectual property rights, and innovation-related activities

A consortium agreement will define precisely the role and duties of the partners and of the project co-ordinator, as well as the terms of reference for the exploitation of the foreground knowledge and access to the relevant background knowledge. In addition, the consortium agreement also specifically addresses some of the issues (reporting procedures, penalties in case of fulfilling the obligation to report in time, procedures with regards to budget allocation, etc.)

A draft of the consortium agreement to be used within the EMMA-project can be found in the Annex.

The consortium agreement will be signed in advance of the actual project start. In case one partner would not have signed the consortium agreement, he would be supposed to accept by default all the rules and principles stated in the contract signed with the European Commission, including its various addendum and technical annex. In the consortium agreement each of the partners will indicate their policies with regard to existing knowledge and knowledge generated in the project.

B.6 Detailed implementation plan

Detailed implementation plan introduction

Modern research projects always need a good mix of fixed structure and controlled flexibility. Learning from our own experience as coordinator and as partner in RTD and other projects, we believe that the following approach to the work plan will address the needs of the project:

1) A high-level structure of six stages, organised (roughly) in <u>semesters,</u> pointing at the likely character of the work envisaged at each stage. We distinguish the following stages:
    understand - design - build - evaluate - mature - demonstrate.
2) A work package structure guided by the major expected results
3) A task level structure based on the dependencies between major expected results (milestones)

High Level Structure of the Work Plan

"**Understand**" - initial research into the identified open questions, such as analysing the envisaged usage scenarios as seen by the end user, such as curators, educators, students, the interested public, etc. as well as the providers of cultural heritage portals, who are intended to host EMMA services. Note that this notion of understanding will start from a high level of previous achievement, given the work already accomplished by the partners.

"**Design**" - starting from high level conceptualisations, build initial prototypes for early user interaction to guide requirements capture. We do not believe that it is possible to capture the requirements of future systems without showing the users "possible worlds" with which they can interact and which they can critique.

"**Build**" - based on the initial conceptualisations and interface prototypes, a structured phase of building the core machinery of EMMA will follow, leading to a system that can be evaluated by the user groups. Note that build-phase and evaluation phase will overlap, with building activities decreasing and usage activities increasing until we have a mature system by month 30.

"**Evaluate**" - Having developed test scenarios during the design stage of the project, we now start with component (unit) testing and proceed to testing the whole system. Note that there will still be development going on, but at decreasing levels.

"**Mature**" Since building, integrating and seriously validating new systems is never trivial (often, these systems introduce paradigmatic changes that have repercussions up to organisational level) we reserve a six-month period to the tuning of the full system and we use this time for technology (re)monitoring, and for bringing the research results up to date.

"**Demonstrate**" - too often in the past, projects have inadequately dealt with disseminating the knowledge created in the project. There are "good" reasons for such inadequacies, e.g. that the solution built was "too big" for the innovative SMEs involved in the development, or the adaptation to a new market proved too hard to do, or the opportunity to actually exploit the results came some time later when a re-design and re-implementation was already a better choice. This sometimes meant that knowledge created at European level had in reality, only regional effect.

Because of the public responsibility of the main partners of the consortium, we reserve a period of six months in which we undertake to organise a "European Road Show" of EMMA results, in order to get the results to interested parties in time. Should there be an overall clustering activity that is suitable, then we would be prepared to adapt our plans to make them compatible with such clustering activities.

A specific possibility is clustering with the BRICKS Integrated Project, both on the technical and the sector-specific activities level. Technologically, the BRICKS approach to dealing with heterogeneous distributed data sources should be considered by EMMA[43]. Since the EMMA consortium has also got strong practical experience from *previous* projects (database integration is <u>*not*</u> a research issue in EMMA), clustering activities would further strengthen the convergence of the technological basis for systems solutions in the CH sector.

Workpackage Description - Overview

The work plan for EMMA is divided into 8 work packages. WP1 is project management. WP2 - WP6 cover the core <u>*Research and Technology Development*</u> (RTD) activities. WP7 deals with dissemination and exploitation; and WP8 is a dedicated <u>*Demonstration*</u> activity in which we intend to do outright knowledge and technology transfer to interested firms and to the cultural heritage sector in Europe.

The workpackage overview is as follows:

1. **Project Management** - Note that we distinguish pure administration: financial and reporting and providing the collaborative work platforms (AD), technical coordination: maintaining the technical and overall project vision (TC); and project quality assurance: checking of all deliverables before submission, as well as checking against the project's critical success factors (QA).

2. **Search, Retrieval, Memes and Contextualisation -** This WP first ensures that the proposed system can connect to a number of digital cultural heritage repositories. The objective in this part of the work is to arrive at a common set of tools and a methodology for integrating CH information systems with semantic web technology. The emphasis of the research will be on a taxonomy of cultural memes and - importantly - on a formal model for representing memes and "ideas". The output of the work package is threefold:
   (1) semantically connected partner databases based on RDF-OWL representations of museum collections;
   (2) Model of meme-structures and Taxonomy of memes;
   (3) Contextualisation component which connects meme structures with
       results of semantic queries against the connected databases.

3. **Multimedia and semantics enabled story construction -** In this WP we research how the contextualised meme-based, content-rich media object that we obtained in WP2 can be re-arranged according to a narrative model and then be presented in a spatio-temporal layout. Additionally, how can interactive hooks be inserted into the narrative structure so as to allow a variety of interactions (following different discourse patterns) in the next step.

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[43] Thomas Risse, Predrag Knecevic, 2005, A Self-organizing Data Store for Large Scale Distributed Infrastructures, International Workshop on Self-Managing Database Systems.

4. **Semantic Social Software Component -** In this WP we address the latest development in semantic web research - the inclusion of social software as a key element to make any community based technological solution work. Our narrative structures, encoded as navigable information objects, will enter the social sphere of on-line communities to engage their users in a cultural discourse which can (seamlessly - if possible) range from popular to advanced and scholarly. This WP produces the third important technological component of the project, namely the semantically enabled discourse platform which brings communities of interested "Netizens" together.

5. **User Requirements, Interfaces and User Validation -** In RTD projects, user needs and requirements are most often only generally addressed in an early project phase, and then more or less ignored until a complete prototype application becomes available for user validation. EMMA will prevent ignoring the targeted users through a comprehensive and rigorous set of activities (WP5). Hence, understanding and meeting the user requirements will be continuously on EMMA's agenda, and realised through early and successive user involvement, testing & validation (e.g., in the development of interfaces).

6. **Field experiments with users -** once controlled testing has occurred, we will devise larger scale experiments to improve our understanding of communities; and to test the system in a setting that is as close as possible to the real world. From these activities, we will gather data, analyse the data and discuss the results with the community. We will then integrate feedback of discussion with community and write reports for developers so that they can improve the system.

7. **Dissemination and exploitation** - Dissemination is concerned with transferring the project's results to other communities and partners outside the project. Therefore, EMMA establishes a number of accompanying measures taken by commercial and academic partners, respectively, in order to exploit and disseminate the findings of the project. We anticipate four specific areas of activity: dissemination and exploitation planning, development of an Open Source Package, development of target-group specific showcases, and finally, technology watch and risk assessment activities.

8. **Demonstration Phase** - Whereas work in WP 7, dissemination and exploitation, is primarily focused on planning dissemination and exploitation activities for the academic and cultural heritage community, WP 8 is an active outreach to technology vendors and the industrial sector in general.

EMMA Workplan

WP/Task	Description	UNDERSTAND						DESIGN						BUILD						EVALUATE						MATURE						DEMONSTRATE					
		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36
WP1	**Project Management**																																				
T1.1	Administrative and financial coordination	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	1,0
T1.2	Technical coordination	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	0,2	1,0
T1.3	QA and project evaluation	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,3	0,4	0,4	0,4	0,4	0,4	1,0
WP2	**Search, Retrieval, Memes and Contextualisation**																																				
T2.1	Access layer to content repositories	3,0	3,0	3,0	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T2.2	Search and Retrieval tools	1,0	-	-	2,0	2,0	2,0	-	-	-	-	-	-	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T2.3	Contextualisation components	-	-	-	-	-	1,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	1,0	1,0	1,0	-	1,0	1,0	1,0	1,0	1,0	1,0	-	-	-	-	-	-
T2.4	Meme Manager	-	-	-	-	-	1,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	1,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T2.5	Meme Taxonomy	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
WP3	**Multimedia and semantics enabled story construction**																																				
T3.1	Story scripts modelling	1,0	1,0	1,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	1,0	1,0	1,0	-	-	-	-	-	-	-	-	1,0	1,0	-	-	-	-	-	-	-	-	-	-	-
T3.2	Multimedia Story generation mechanism	-	-	2,0	2,0	2,0	2,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	1,0	1,0	1,0	1,0	1,0	-	-	-	-	-	-	-	1,0	1,0	-	-	-	-	-	-	-	-	-
T3.3	Semantically enabled multimedia story player	2,0	2,0	2,0	-	-	-	-	-	-	2,0	2,0	2,0	-	-	-	-	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T3.4	Scripts and Story management system	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	-	-	-	-	-	-
WP4	**Semantic Social Software Component**																																				
T4.1	Discourse Models	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	-	-	-	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4.2	Social software paradigms and semantics	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4.3	Discourse and Community Manager	-	-	-	-	-	-	3,0	3,0	3,0	3,0	3,0	3,0	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-
T4.4	User Modelling and User Agent	2,0	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T4.5	User Interface Development	-	-	-	2,0	2,0	2,0	-	-	-	-	-	-	3,0	3,0	3,0	3,0	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	1,0	-	-	-	-	-	-
T4.6	System Integration	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	1,0	2,0	2,0	2,0	-	-	-	-	-	-	-
WP5	**User Requirements, Interfaces and User Validation**																																				
T5.1	User groups and functional requirements	2,0	2,0	-	-	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	2,0	2,0	-	-	-	-	-	-	-	-	-	-	-	-	-
T5.2	Social software community research and development	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,0	1,0	-	-	-	-	-	-	-
T5.3	Interface and Interaction Design	-	-	2,0	2,0	2,0	2,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	2,0	2,0	2,0	2,0	-	-	-	-	1,0	-	-	-	-	-	-	-	-
T5.4	User testing & validation plan	-	-	-	-	-	1,0	1,0	1,0	1,0	-	-	-	-	-	-	-	-	-	1,0	2,0	2,0	3,0	3,0	3,0	2,0	-	-	-	1,0	1,0	-	-	-	-	-	-
T5.5	User testing & validation results	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	1,0	1,0	-	-	-	-	-	-
WP6	**Field experiments with users**																																				
T6.1	Access to Post-War Cultural History Collections	-	-	-	1,0	1,0	1,0	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	1,0	-	-	-	-	-	-	1,0	1,0	1,0	-	-	-	-	-	-	-	-
T6.2	System Installation at lead user management for user	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	1,0	-	-	-	-
T6.3	Discourse field experiment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,0	3,0	3,0	3,0	3,0	-	-	-	-	-	-	-	-	-	-	-	-	-
T6.4	Corrective maintenance	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	1,0	-	-	-	-	-	-
WP7	**Dissemination and exploitation**	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
T7.1	Dissemination and exploitation plan	-	-	-	-	-	-	-	-	1,0	1,0	-	-	-	-	-	-	1,0	1,0	-	-	-	-	-	1,0	1,0	-	-	-	-	-	-	1,0	1,0	1,0	1,0	1,0
T7.2	Development of Open Source Package	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	-	-	-	-	-	-	-	1,0	1,0	1,0	2,0	2,0	2,0	1,0	1,0
T7.3	Development of EMMA showcases	-	-	-	-	-	-	1,0	1,0	-	-	-	-	1,0	1,0	1,0	-	-	-	-	-	-	1,0	1,0	-	-	1,0	1,0	1,0	1,0	1,0	-	-	-	-	-	-
T7.4	Technology Watch and Risk Assessment	-	-	-	-	-	-	-	-	-	-	-	2,0	-	-	-	-	-	-	2,0	-	-	-	-	-	2,0	-	-	-	-	-	1,0	-	-	-	-	-
WP8	**Demonstration Phase**																																				
T8.1	On-line demonstration	-	-	-	-	-	-	-	-	-	-	1,0	1,0	-	-	-	-	-	-	-	-	-	-	-	-	1,0	1,0	1,0	1,0	-	-	1,0	1,0	1,0	1,0	1,0	1,0
T8.2	EMMA Technology Road Show	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3,0	3,0	2,0	2,0	2,0	1,0
T8.3	EMMA Results Dissemination to Industrial Community	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2,0	2,0	2,0	2,0	2,0	2,0

EMMA Pert Diagram

Graphical presentation of the components, showing their interdependencies
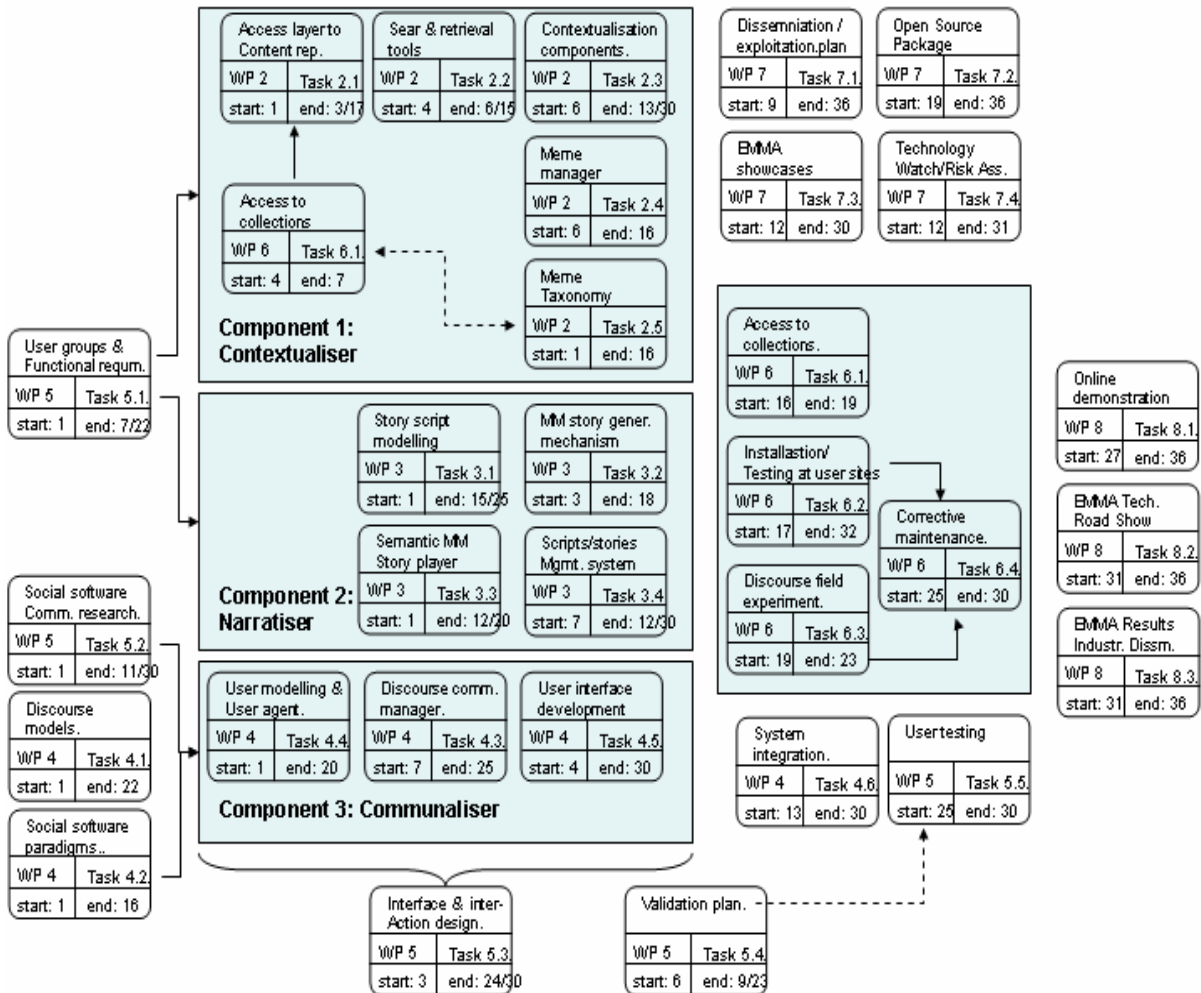
Workpackage list

WP No.	Workpackage Title	Lead Contractor No.	Person Months	Start Month	End Month	Deliverables No.
WP 1	Project Management	1	28	1	36	D1-1 D1-2 D1-3 D1-4 D1-5 D1-6 D1-7
WP 2	Search, Retrieval, Memes and Contextualisation	1	101	1	27	D2.3.1 D2.4.1 D2.5.1
WP 3	Multimedia and semantics enabled story construction	2	87	1	27	D3.1.1 D3.2.1 D3.3.1 D3.4.1
WP 4	Semantic Social Software Component	4	134	1	30	D4.1.1 D4.3.1 D4.4.1 D4.6.1
WP 5	User Requirements, Interfaces and User Validation	7	102	3	28	D5.1.1 D5.2.1 D5.3.1 D5.4.1 D5.5.1
WP 6	Field experiments with users	9	52	16	31	D6.1.1 D6.2.1 D6.3.1
WP 7	Dissemination and exploitation	6	47	7	36	D7.1.1 D7.2.1 D7.3.1 D7.4.1
WP 8	Demonstration Phase	1	37	27	36	D8.1.1 D8.2.1 D8.3.1

Deliverables List

Deliverable No	Deliverable title	Delivery date	Nature	Dissemination level
D1-1	Progress Report	M6	Report	RE
D5.2.1	Semantic social software community development guidelines	M9	Report	RE
D5.4.1	User Testing & Validation Plan	M9	Report	RE
D7.1.1	Dissemination and Exploitation Plan	M10, M25	Report	PU
D1-2	Progress Report	M12	Report	RE
D3.3.1	Design of a semantically enabled multimedia story player	M12	Other	RE
D3.4.1	Design of a Scripts and Story management system	M12	Other	RE
D5.1.1	Functional Requirements - Release 4	M12	Report	RE
D7.4.1	Technology Watch Report	M12, M18, M24	Other	PU
D2.3.1	Design of the **Contextualiser** component	M14	Report	RE
D3.1.1	Internal model and taxonomy of story scripts	M15	Other	RE
D5.3.1	Interaction Design and Interface Design	M15	Other	RE
D6.1.1	Collection metadata and technical access specifications	M15	Other	RE
D4.6.1	Design and Implementation of the **Memetiser** Component of EMMA	M16	Other	RE
D2.4.1.	Design of Meme Model and Meme Manager functions	M17	Other	RE
D1-3	Progress Report	M18	Report	RE
D3.2.1	Design of the multimedia generation mechanism (**Narratiser**)	M18	Other	RE
D2.5.1	Paper Model of the Meme Taxonomy	M18	Report	RE

D4.4.1	Design and Implementation of the User Agent and User Interface	M20	Other	RE
D4.1.1	Design and Implementation of the Discourse Model for EMMA	M21	Other	RE
D6.2.1	System Installation - Final Report	M21	Report	RE
D1-4	Progress Report	M24	Report	RE
D4.3.1	Design and Implementation of the Discourse and Community Manager	M25	Other	RE
D6.3.1	Report on the field experiment with social discourse on the EMMA platform	M25	Report	RE
D1-5	Progress Report	M30	Report	RE
D7.3.1	EMMA Showcases (four show cases)	M30	Other	RE
D5.5.1	User Testing & Validation Results	M30	Report	RE
D8.1.1	On-line demonstration of the EMMA system at three partner nodes	M31	Demonstrator	PU
D1-6	Final External Report	M36	Report	RE
D1-7	Final Internal Report	M36	Report	CO
D7.2.1	Open Source Software Package	M36	Other	PU
D8.2.1	Final Report on the EMMA Technology Road Show	M36	Report	PU
D8.3.1	EMMA Research Archive: All papers written in the project lifetime	M36	Other	PU

Work Package description

Work Package 1 - Project Management

Workpackage number	**WP1**		Start date or starting event		Project Month 1					
Workpackage title	**Project Management**									
Participant id	**SRFG**	**CWI**	**CNR**	**KMI**	**UT**	**PRC**	**TaiK**	**TAU**	**TKK**	**IS**	**TII**
Person-months per participant	18	1	1	1	1	1	1	1	1	1	1

WP Lead: SRFG

Objectives

- Ensure the timely execution of all project related activities, paying attention to resource efficiency and effectiveness
- Manage and control the project's resources, budget, time plans and activities and represent the project externally in all matters – financial, administrative, technical, contractual
- Guarantee the timely delivery of agreed-upon deliverables
- Ensure the best quality of project deliverables by following appropriate technical quality assurance plans
- Assure an effective internal and external project communication to optimise the utilisation of project resources

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Description of work:

The project management is responsible for the day-to-day operation of the project to assure – in co-operation with the workpackage leaders and the working group leaders – that project milestones are reached within the proposed time-period, and agreed-upon deliverables are issued in a timely manner and in high quality. This task is carried out by the project co-ordinator and contains the following:

- Liaison with project partners as well as the European Commission
- Co-ordination and preparation of consortium meetings and technical workshops
- Internal and external communication of project milestones and results
- Internal and external reporting: activity plans, management reports to the other project partners and the European Commission providing information on all administrative and financial aspects
- Conflict management
- Quality assurance and control

The co-ordinator will be assisted by the project core group (PCG) and the leaders of each

workpackage. The latter are responsible for:

- Liaison with the other partners of the working group
- Preparation of working group meetings (agenda, venue, minutes)
- Internal communication with regards to project milestones and results, activity plans, and management reports
- Quality control of workgroup-related workpackages
- Conflict management within the working group
- Communication of work-related conflicts with regards to workplan resources

T1.1   Administrative and financial coordination(8)

The first task with regards to general project management is the installation and setting up of an adequate online communication and collaboration platform, including telephone and conferencing facilities, as well as assignment of the administrative representative on side of the partners. Further tasks will include the timely production of management, progress, and cost reports according to the established reporting procedures (see. B5, Project Management).

T1.2   Technical coordination   (8)

One of the first tasks in technical coordination will be the break down of the existing workplan into detailed task briefs, which include clear resource and time planning on a sub-task level, as well as more detailed clarification of task and sub-task dependencies. Related to this is the fine tuning of the time table and delivery schedule from the original monthly basis, to a weekly basis.

Technical coordination also includes revisiting and supplementation of the risk management plan, further identifying EMMA-specific technical and scientific risks and defining risk management for each of them.

T1.3   QA and project evaluation (12)

QA encompasses both, internal and external quality assurance procedures.

With regards to internal QA, work to be carried out includes: supplementation of the *SRFG Quality Assurance and Self-Assessment Handbook* according to the specific needs of the EMMA project, briefing of all partners with regards to the QA procedures, appointment of QA mentors as well as assignment of other roles and responsibilities, etc.

With regards to external QA, the STM Core Team will identify and contact four external QA reviewers, and agree on a review cycle for the major EMMA technical and scientific deliverables.

Deliverables

D1-1   Progress Report (M6)

D1-2   Progress Report (M12)

D1-3   Progress Report (M18)

D1-4   Progress Report (M24)

D1-5   Progress Report (M30)

D1-6   Final External Report (M36)

D1-7   Final Internal Report (M36)

Milestones and expected result

Review after Month 12

Review after Month 24

Final Review

Work Package 2 – Search, Retrieval, Memes and Contextualisation

Workpackage number	**WP2**			**Start date or starting event**			Project Month 1				
Workpackage title	**Search, Retrieval, Memes and Contextualisation**										
Participant id	**SRFG**	**CWI**	**CNR**	**KMI**	**UT**	**PRC**	**TaiK**	**TAU**	**TKK**	**IS**	**TII**
Person-months per participant	24	6	12	13	5	2	4	18	11	6	0

WP Lead: SRFG

Objectives

We need to

- support search over open repositories (e.g. web based resources),
- retrieval from catalogue database systems
- associate non-semantic, retrieved data with semantic representations
- contextualise the "semanticised" information by linking it to meme structures
- build a prototype knowledge base to represent and manage memes which should be understood as high level conceptual artefacts that can be communicated between agents (human or machine).

Description of work:

The first two tasks are necessary to ensure validation of the proposed new ideas, but the access layer and the search and retrieval tools will be based on existing expertise with heterogeneous, distributed CH repositories, by using an integration approach via ontological mapping. We will be drawing upon TKK's and SRFG's experience with such systems and we will develop a common practical methodology for semantically connecting existing repositories, based on the partner's varied experience.

T2.1   Access layer to content repositories   19

We will integrate and use existing tools and prototypes to create a semantic interoperation layer between the social software and CH data management systems. TKK will be bringing in their

experience with Finnish Museums on the Semantic Web. SRFG will bring in their knowledge of CH Standards and XML based integration of catalogues into semantic web.

T2.2   Search and Retrieval tools   13

SRFG will adapt the contextualisation engine originally developed in the FP5 project VICODI, and will use other existing tools and prototypes to access content repositories including the web and to generate semantically wrapped query results.

T2.3   Contextualisation components   24

develop an advanced query mechanism that combines IR, user preferences, meme structures and domain knowledge to construct a raw knowledge thread from retrieved content

T2.4   Meme Manager   24

TAU will lead the *conceptual* work on representing Memes, based on their existing work with inter-textual cultural threads. CNR will *formalise* this conceptual work based on foundational ontologies and will link it to CIDOC CRM. SRFG will co-develop the formal representation and build the meme manager - a knowledge base which handles and semi-automatically organises, memes according to the meme taxonomy.

T2.5   Meme Taxonomy   25

TAU will lead the work on a taxonomy of human memes, which will subsequently be formalised with the help of CNR, to be used in an advanced information system.

Deliverables

D2.3.1 Design of the **Contextualiser** component

D2.4.1. Design of Meme Model and Meme Manager functions

D2.5.1 Paper Model of the Meme Taxonomy

Milestones and expected result

MS   Design of the Contextualiser

MS   Paper Model of the Meme Taxonomy

Work Package 3 – Multimedia and semantics enabled story construction

Workpackage number	**WP3**			Start date or starting event			Project Month 1				
Workpackage title	**Multimedia and semantics enabled story construction**										
Participant id	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII
Person-months per participant	13	27	16	6	3	0	0	10	6	6	0

WP Lead: CWI

Objectives

This workpackage encompasses the development of the Narrator Presentation Environment (NPE)., which allows users of the EMMA environment to investigate the associated discourse space (the content presentation is based on compilation on demand rather then pre-generated templates).

The main goal for the NPE is to allow the user ostensive browsing. We envision a system that allows a flexible presentation depending on the characteristics of the objects found (discourse objects generated in the Semantic Social Software Component, see WP 4) and reflecting the changing focus of the user's information interest (detected by the Discourse Continuity Manager, see WP4) by adequate content selection (Narrative Generator) and a sensible presentation at the appropriate abstraction level (Multimedia Player). This WP relies on the results of WP2 and WP4 and will influence the developments of WP4.

Description of work:

This workpackage specifies and implements the NPE system, which allows the community using EMMA to specify the presentation design, and provides the retrieval interface for users interested in the content of the information space. The following tasks of this WP result in a prototype that will be evaluated in the middle of the project on a technical and usability level as described in WP 6.. The suggested improvements and further developments serve as guidelines for research and development issues for the second half of the project.
The tasks of this working package are:

T3.1   Story scripts modelling   26

In this task we develop the taxonomy of the story scripts. Depending on the results of WP 5 we will focus on a set of particular useful set of story scripts. The development of the taxonomy will be closely connected to the memes developments in WP2.

T3.2   Multimedia Story generation mechanism   25

This task is devoted to the functional prototype of the Narrator unit, which transforms the current context into next step of the discourse. The actions performed by the Narrator units are, generating the next part of the overall story (using the story scripts), searching for equivalent material (in the database or on the web), analyses the new material and adapt it to the story needs and generate the

new output list for the multimedia story player.

T3.3   Semantically enabled multimedia story player   20

The outcome of the 'Narratiser' will be a SMIL 2.0 structure that can be presented on any SMIL enabled browser/player. The important aspect here is the handling of story jumps, in the form of hyperlinks. This requires a communication channel; between the player and the Narrator unit.

T3.4   Scripts and Story management system   16

This tasks provides the necessary editors for the developments of the scripts in the 'Script editor' and the rules in the 'Narrator'.

Deliverables

D3.1.1 Internal model and taxonomy of story scripts

D3.2.1 Design of the multimedia generation mechanism (**Narratiser**)

D3.3.1 Design of a semantically enabled multimedia story player

D3.4.1 Design of a Scripts and Story management system

Milestones and expected result

MS   D3.2.1 Design of the **Narratiser** component, combining the above deliverables

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Work Package 4 – Semantic Social Software Component

Workpackage number	**WP4**				**Start date or starting event**			Project Month 1			
Workpackage title	**Semantic Social Software Component**										
Participant id	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII
Person-months per participant	34	8	12	24	18	14	0	12	0	12	0

WP Lead: KMI

Objectives

- Design and implement a framework for semantic social software whereby the conceptual significance of dialogue structures can be used to drive search, organisation and presentation of knowledge and CH content
- An approach to integrating semantic social software with multimedia presentations to support dialogue motivated by, and about, the presentations and their content.
- Integrated versioning of multimedia presentations so that the evolution of ideas and the

how they are reflected in their associated presentations can be visualized.

- Development of engaging interfaces based on interaction design
- Ensuring the delivery of a stable prototype system suitable for significant user validation

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Description of work:

This work package is addressed at developing some of the critical success factors of the EMMA system, in terms of software prototypes. Therefore, we will spend considerable effort in determining user requirements and in developing sound designs before implementation. The work package will be concluded with a phase of system integration. The main result of this work package will be the functionality needed by the *Memetiser* component.

T4.1 Discourse Models   36

We will need discourse models both in the definition of scripts for narratives for multimedia presentation and for the semantic support of user interaction on the community platform. Since these are likely to be the same tasks, conceptually, we believe that we can create a very comprehensive model, based on significant pre-existing research. The design phase is allocated 18 PM (TAU as lead and CNR) and will span over the first 9 months of the project. The implementation phase led by SRFG and is planned to start at the beginning of year two, also lasting for 9 months. Outcome of this task will be a discourse paper model and a formal discourse ontology which should be usable for driving different types of interaction on the social software platform.

T4.2 Social software paradigms and semantics 12

Research here will add to the deliverable D5.2.1 Semantic social software community development guidelines (M9) on the one hand, and use the knowledge gained here for the design and implementation of the **Memetiser** component

T4.3 Discourse and Community Manager   24

Work here will support integration of multimedia presentations with collaboration structures. Knowledge level descriptions will be used to express the meaning conveyed by online dialogue structures. The integrated versioning of the multimedia presentations will allow their evolution within the community to be visualised and their relationship to the ongoing dialogue.

T4.4 User Modelling and User Agent   18

We use the "agent" metaphor for describing the services and functions offered by the system to its user. However, only as we understand the requirements of that agency will we decide upon the apropriate design and implementation technology, keeping our options open towards a service oriented or a strongly agent-based implementation. A reasonable compromise may well be to use the anthropomorphised notion of "agent" as a metaphor for user interaction, and to use the more business-related metaphor of "service orientation" for the server-side functionalities of the system. We will pay particular attention to a relatively comprehensive design of users (user model) because we feel that current models have shortcomings which result in inadequate matches between the agent's actual capabilities and the user's mental model of the (agent's) desired capabilities. The general user modelling task will be started at the beginning of the project and the

specific adaptation will be done in the second modelling phase (M17 - M20).

T4.5   User Interface Development   29

We will specify and develop metaphors and a visual language on the basis of user models. The objective is to define adaptable components and templates for the user interface. The development will be based on intensive work with user groups to capture good requirements (early phase of WP5).

T4.6   System Integration   15

We will devise a detailed component integration plan at the beginning of the project. It must be understood that each of the technical partners can make use of existing modules representing many person years of development work. However, only those components which are of sufficient overall quality and in accordance with current service oriented architectures, are really fit for inclusion. Furthermore, the technical partners have employed a range of different knowledge technologies (some LISP based, some Prolog based, others Java/RDF/XML based) and it will be both a challenge and a significant mobilisation of resources to bring these components into a common service based integration framework. Actual integration is scheduled for months 13-16 and 27 to 30 for the second iteration, but we will spend some effort already early in the project to assess the integration needs arising out of the different platforms.

Deliverables

D4.1.1 Design and Implementation of the Discourse Model for EMMA

D4.3.1 Design and Implementation of the Discourse and Community Manager

D4.4.1 Design and Implementation of the User Agent and User Interface

D4.6.1 Design and Implementation of the **Memetiser** Component of EMMA

Milestones and expected result

MS D4.6.1   Design and Implementation of the **Memetiser** Component of EMMA

Work Package 5 – User Requirements, Interfaces and User Validation

Workpackage number	WP5		Start date or starting event		Project Month 3				
Workpackage title	User Requirements, Interfaces and User Validation								
Participant id	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII
Person-months per participant	15	3	6	3	2	17	29	5	4	6	12

WP Lead: TaiK

Objectives

The overall objectives of this large WP are to ensure

- a clear and in-depth understanding of the needs and requirements of the target user groups of the EMMA system,

- early and successive user involvement, testing, & validation with respect to functionalities, interfaces and interaction mechanisms,

- identification and communication of required improvements..

This should help to ensure a broad uptake of EMMA's semantic technologies in the cultural sector and beyond, based on the perceived benefits they make possible, and the interoperability and ease of use they allow.

Description of work:

On order to capture and understand user needs and requirements, and track achievements of the project with respect to these, comprehensive and methodologically well-founded work will be carried out. This will include research on needs and requirements of different user groups (CH institutions, communities of interest/practice), in particular, on success criteria for the use of semantic social software, involvement of users in interface and interaction designs, and user testing and validation work.

T5.1   User groups and functional requirements   24

Work in this task will concentrate on identifying and understanding the user groups with respect to tasks and situations in which they may benefit from making use of the EMMA semantic technologies. This will include, but not be limited to, CH service operators (e.g., portal managers), institutions (e.g., curators, content managers), users such as scholars and students, as well as members of non-professional communities and individuals. With respect to the functional requirements, an analysis of the knowledge needs of the user groups (which may considerably differ as well as overlap) will be done using methods such as focus groups and structured questionnaires for individual interviews who are involved in established cultural communities of interest/practice. Further practical insights are to be expected through the involvement of users in the interfaces and interaction design work (T5.3).

T5.2: Social software community research and development   13

In order to ensure the success of EMMA's semantic social software (SSS), research on issues pertaining to how social software based communities work in practice will be carried out. This will include gathering interesting results from available empirical studies, observation of selected communities, and other insights particularly related to groups interested in cultural themes. Such groups will of course also include CH academic and professional communities that already use social software. While in WP4.2 ("Social software paradigms and semantics") a technical state-of-the-art analysis of existing and emerging social software tools will be made, the task of T6.2 is to develop a useful ethnology (e.g., roles, practices, technical preferences) of online communities that use such tools. Of particular interest in this work is to identify social factors, technical features, and specific benefits that may foster a broad use of semantic tools by online communities in the CH sector and beyond. The results in the form of SSS community development guidelines will inform the user interface design (T5.3), development (T4.5), testing and evaluation plan/work (T5.4-5) as well as the dissemination and exploitation plan (T7.1).

T5.3   Interface and Interaction Design   33

a) Interaction design: This involves the creation of an interaction structure that maps to and supports particular knowledge needs and activities required to, for example, acquire, annotate and share content, narratives, or 'knowledge units'. The following diagram illustrates how scenario-based representations of the system, particularly, what it will mean to interact and benefit from it, are used to inform a co-design in which developer and users collaborate.
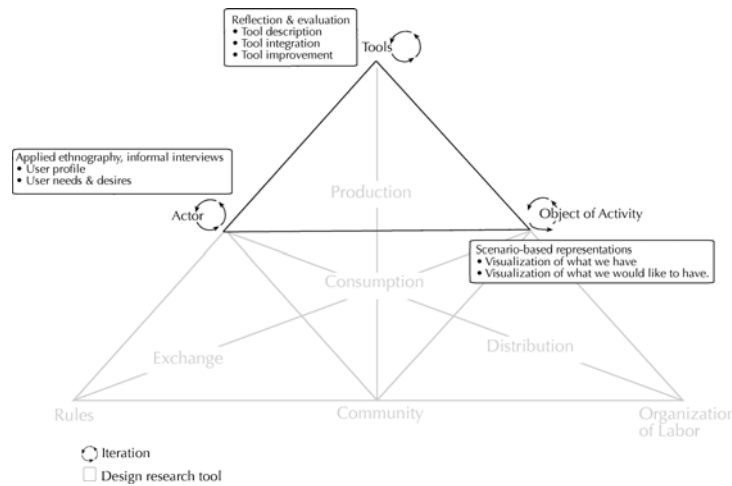

Figure 1: Application of Yrjö Engeström's model of activity to design research. The model [from: Learning by Expanding, 1987] shows iterative use of scenarios as tools for collaborative envisioning.

b) Interface design: This work will take into account the ethnographical results of T5.2 (e.g. roles, practices, technical preferences of online communities) as well as further insights and directions acquired in the practical design work, again, involving end users. Such insights and directions may pertain to certain codified practices (e.g., adherence to standards or institutional procedures) as well as practical expectation and considerations which may not be easily captured in other methods such as interviews.
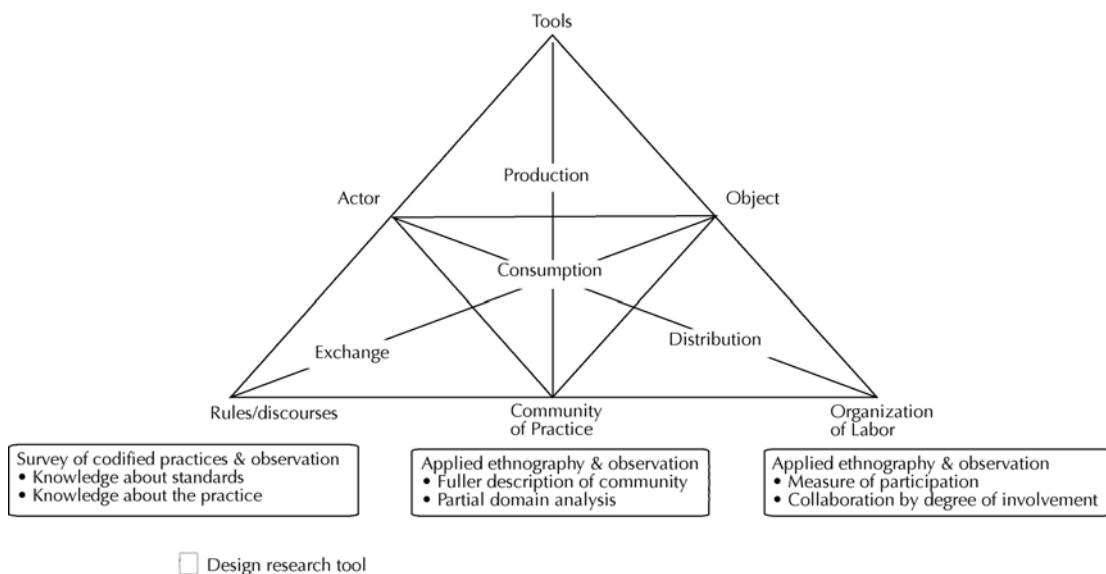
Figure 2: Activity model shows data gathering about communities, their practices and their social organization.

c) Test case development: Based on the information and insights acquired, the developers create (a) a detailed interaction design structure description and specifications in written and visual format and, based on this, (b) a first iteration for graphic user interface (GUI) design, with user

requirements, and specification guidelines. Demos of the interfaces will created to allow for early and repeated user testing.

T5.4   User testing & validation plan 22

In order to ensure systematic testing and validation of the system with respect to functionalities, interfaces and interaction mechanisms a detailed plan of the related activities will be drafted, circulated, and agreed upon. The plan will specify goals, required settings and contexts, methods, metrics, schedules, and templates for reporting the results. In order to capture and refine the usability of the system in terms of interfaces and interaction processes, qualitative and, wherever possible, quantitative feedback information will be captured (e.g. technical interaction data, feature inspection results, structured interviews, observations)

T5.5   User testing & validation results 10

End-user testing & validation will include three different activities and environments: (a) a larger exhibition planned at Stockholm City Museum, (b) a cultural study course at the New Media Laboratory of the Panteion University [more details are provide in Annex 3], and (c) a larger online field experiment (cf. T.3). The information obtained by the methods as specified in T5.4 (above) will be carefully analysed, and interpreted from different perspectives. These will include those of the user communities themselves. This will help drive interface and interaction improvements and allow for better understanding how the tools are framed and understood by the users themselves. Hence, the validation reports will not only be helpful in further refining the system, but, also be of high value with respect to the exploitation strategies. Results from the activities (e.g. in the Museum) will also be captured in order to be used as demos to showcase aspects of the system to interested parties.

Deliverables

D5.1.1 Functional Requirements - Release 4 (M12)

D5.2.1 Semantic social software community development guidelines (M9)

D5.3.1 Interaction Design and Interface Design (M15) including two elements:

- Interaction design structure description and specifications in written and visual format. Work in progress reports at months 5 and 10; Final public deliverable in M15.

- First iteration for graphic user interface (GUI) design, with user requirements, and specification guidelines.

D5.4.1 User Testing & Validation Plan, including user community activity that can be used as demo to showcase the system

D5.5.1 User Testing & Validation Results - Usability and validation reports that can be used to further refine the system.

Milestones and expected result

MS   D5.1.1 Functional Requirements - Release 4 (M12)

MS   D5.3.1 Interaction Design and Interface Design (M15)

MS   D5.5.1 User Validation Results (M32)

Work Package 6 – Field Experiment with Users

Workpackage number	**WP6**			**Start date or starting event**			Project Month 16				
Workpackage title	**Field experiments with users**										
Participant id	**SRFG**	**CWI**	**CNR**	**KMI**	**UT**	**PRC**	**TaiK**	**TAU**	**TKK**	**IS**	**TII**
Person-months per participant	9	0	0	4	4	4	8	5	7	5	6

WP Lead: TKK

Objectives

The objectives of this WP are

- to ensure proper technical access to selected CH institutions' special collections for testing the EMMA system components & tools,
- to install server components and clients at the test sites, and support their proper use
- to prepare and run a larger online field experiment for testing the social platform prototype and discourse community manager

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Description of work:

T6.1: Access to post-war cultural history collections   10

EMMA will run pilots on the semantic portal MuseumFinland [created and maintained by partner TKK] and the 'Memory of the Netherlands' digital collections at the Koninklijke Bibliotheek. They have different established content access systems and different levels of content description. In this task EMMA test partners will clarify the required provisions for the technical access to the digital collections (metadata, semantic layer, and content). A pre-selection of relevant post-war cultural collections of the 'Memory of the Netherlands' has already been made (see Annex 3); as for the Museum-Finland, museums participating in the FinnONTO initiative [led by partner TKK] are willing to provide further digital collections, if required.[44] The results of this task will be taken into account in T2.1-T.3 (Access layer to content repositories; Search and Retrieval tools; Contextualisation components) and T6.2 (below).

T6.2   System installation and lead user management for user sites   16

In this task, EMMA partners will install server components (provider side) and clients (end-user) at the test sites: [1] MuseumFinland, [2] Koninklijke Bibliotheek, [3] Stockholm City Museum, and the [4] New Media Laboratory of the Department of Communication, Media and Culture of Panteion University. In order to ensure a proper working and use of the technology, technical service staff and educational personnel at the sites [3: exhibition environment] and [4: study course

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[44] Note: The idea is to from the start use special collections that are particularly rich in terms of inviting participants (non-CH experts, but also curators, historians) to later upload related items, tell their stories, and engage in conversations in a SSS based community.

environment] will be introduced 'hands-on' to the tools and their features. Here the partners Interactive Institute/V4M and PRC Group will be available for further support. During the larger field experiments (T6.3 below) a helpdesk will be available to guide and support online users.

T6.3   Discourse field experiment 15

Under this task, a larger online field experiment will be run to test the social platform prototype and discourse community manager. For this experiment, the Finnish and Dutch EMMA partners will invite participants from their countries. The participants will be CH professionals (e.g., from the Finnish Antikvaria-group of some 20 major museums) as well as interested non-professional users. The field experiment will be documented, analysed and reported according to the guidelines defined in T5.5 (User testing & validation results).

T6.4   Corrective maintenance   11

This task is reserved for the development partners to correct their software prototypes after the evaluation cycle. Based on issue-tracking methods, there will be a ranking of weaknesses from usability issues to critical errors and the prototypes will be improved up to the point where we run out of effort in this task. Some further improvement is possible in the demonstration phase and further improvement will depend on the uptake of the EMMA software in the Open Source Communities.

Deliverables

D6.1.1 Collection metadata and technical access specifications (M15)

D6.2.1 System Installation - Final Report (M21)

D6.3.1 Report on the field experiment with social discourse on the EMMA platform

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Milestones and expected result

MS D6.1.1   Collection metadata and technical access specifications (M15)

MS D6.2.1   Server components and clients installed at the test sites (M21):

Work Package 7 – Dissemination and Exploitation

Workpackage number	**WP7**		**Start date or starting event**			Project Month 7				
Workpackage title	**Dissemination and exploitation**									
Participant id	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII
Person-months per participant	7	2	5	5	5	6	3	3	3	4	4

WP Lead: PRC Group

Objectives

- Identify stakeholders, such as cultural organizations, on line communities, academic and research communities, and the end-user, at national or regional level, in order to promote the use of tools and platforms beyond the purposes of the project itself.
- Identify and nurture a community with an interest in culture and cultural heritage information, and connect this community with the Semantic Web, engaging it in the construction of narratives by providing their stories and testimonies.
- Ensure that the results of the project produced within each workpackage will be disseminated through different delivery channels (traditional media, web, etc.), in order to raise awareness.
- Monitor the research results and the technological advancements that could have significant impact on the project and expand the European research agenda by networking activities with other European funded projects and major scientific and academic organizations.
- Evaluate the results of the project and define the exploitation strategy which needs to be followed by means of sharing the knowledge acquired during the lifetime of the project.

Description of work:

Dissemination is concerned with transferring the project's results to other communities and partners outside the project. Therefore, EMMA establishes a number of accompanying measures taken by commercial and academic partners, respectively, in order to exploit and disseminate the findings of the project. We anticipate four specific areas of activity: dissemination and exploitation planning, development of an Open Source Package, development of target-group specific showcases, and finally, technology watch and risk assessment activities.

T 7.1   Dissemination and exploitation plan   11

Task 7.1. focuses on developing and drafting the dissemination and exploitation plans for EMMA technologies. While the dissemination plan will focus primarily on effectively reaching relevant academic (science and technology research) and cultural heritage communities by presenting EMMA in the framework of conferences, events, and exhibitions, as well as publishing papers in relevant journals, exploitation planning will focus on activities to reach vendors in relevant technology areas (knowledge [management] technologies, providers of community portals, etc.) who may have a commercial interest in EMMA technologies. In particular, exploitation planning will focus on preparing the EMMA technology road show.

Tasks in dissemination and exploitation planning include identifying relevant conferences/publications and technology vendors, respectively, fostering co-operation and cluster activities with other projects within FP6 (see section B3), organising open workshops for academic discussion to take place at various stages of the project, and forming strategic relations to relevant networks and organisations (National Representatives Group, standardisation bodies, etc.) Exploitation planning also includes establishing first contact with commercial vendors and scheduling workshops for the EMMA technology road show (see Task 8.2.).

T 7.2   Development of Open Source Package   17

Around mid-time of the project, once the first prototypes for the EMMA components, the STM Core Team needs to identify and evaluate the exploitation potential for each of the EMMA components (which is also market-dependent). We distinguish between:

- components that have a high potential for commercial exploitation (see also <mark>Task</mark>
- components in which the participating partners have a vested interest,
- components that should be made available as open source software (for example, to the cultural heritage and learning community).

Having identified those software components that will be made available as open source, we will investigate in detail currently available open software licensing schemata, and package and make available for download the identified software components under an open software license.

T 7.3   Development of EMMA Showcases   12

The major objective of this task is to develop 4 four target group-specific showcases as self-running, stand-alone, animated presentations. Conceptualised as illustrative demos of the EMMA "story and social content engine", especially designed to illustrate the various EMMA functions for particular user communities. The following showcases will be developed:

- EMMA showcase for cultural heritage institutions (as stand-alone presentation on touch screen displays);
- EMMA showcase for the learning community (use of cultural heritage resources in the classroom);
- EMMA showcase for the commercial vendors (for presenting EMMA during industrial fairs and exhibitions, as well as for the road show);
- One final showcase to be defined in the course of the project.

T 7.4   Technology Watch and Risk Assessment   7

To ensure that the relevance and adoption of the project results by its main stakeholders is achieved and maintained, a formal technology watch process will be set up to address and aid the dissemination needs of the project. The aim of this process will be to track other technological and research advancements that may have significant impact in the course and execution of the EMMA project or affect its technological scope. The same process will assist the overall Risk Management activity as well as project decisions concerning the consortium's agreement on technical, scientific and commercial ideas that may cultivate use of the research results in the CH sector or other sectors involving use of semantic social software.

Deliverables

D7.1.1 Dissemination and Exploitation Plan

D7.2.1 Open Source Software Package

D7.3.1 EMMA Showcases (four showcases)

D7.4.1 Technology Watch Report

Milestones and expected result

MS D7.2.1   Open Source Software Package

Work Package 8 – Demonstration Phase

Workpackage number	WP8			Start date or starting event			Project Month 27			
Workpackage title	**Demonstration Phase**									
Participant id	SRFG	CWI	CNR	KMI	UT	PRC	TaiK	TAU	TKK	IS	TII
Person-months per participant	6	1	2	4	2	5	3	2	4	5	3

WP Lead: SRFG

Objectives

- Demonstrate the EMMA system to the *industrial* community in order to maximize the chances of uptake outside of the consortium;
- Liaise and build relationship with industrial community;
- Make available the EMMA prototype to the interested public for validation and testing;

Description of work:

Whereas work in WP 7, dissemination and exploitation, is primarily focused on planning dissemination and exploitation activities for the academic and cultural heritage community, WP 8 is an active outreach to technology vendors and the industrial sector in general.

T8.1   On-line demonstration   12

The objective of Task 8.1. is to enable the interested community to test and validate the EMMA software suite by installing and setting up the EMMA system at partner sites. Each of the three core technology partners will host an EMMA node, which will be open to the public for testing. In addition, each technology partner, using their own networks and contacts, will invite interested communities to participate in the testing and validation. Thus, this task is complementary and supplemental to the user validation phase to be carried out in WP 5, and the field experiments to be carried out in WP 6. Yet, whereas there will be briefing sessions for the test users in WP 5 & 6, user testing in this task will not be guided in any way, and therefore will be a good tool to collect the public's opinion.

T8.2   EMMA Technology Road Show   13

Task 8.2. quite literally aims at taking EMMA on the road to visit 20 commercial vendors and demonstrate the EMMA software components, concepts and functionalities. The EMMA technology road show is an active outreach to the industrial community, to establish industrial partnerships and increase the chances for commercial uptake of selected components of EMMA results. While planning these activities and scheduling the workshops takes place within WP 7.1., actual demonstration is part of WP 8.2. Tasks include preparation of the one or two day workshops (synchronising the presentation with sector-requirments), and demonstration of EMMA software

on the vendor's site. (See also part B3)

T8.3   EMMA Results Dissemination to Industrial Community   12

In comparison to the dissemination activities in WP 7, that focus primarily on the academic and cultural heritage communities, results dissemination in WP 8 concentrates on reaching relevant industrial partners, standardisation bodies, and other industrial multipliers by presenting EMMA at relevant fairs, conferences, and workshops. Tasks include identifying relevant events, preparation and organisation of posters or on-site demonstrations, and active information of the industrial communities through relevant multipliers (innovation relay centres, creative industry clusters, etc.)

Deliverables

D8.1.1 On-line demonstration of the EMMA system at three partner nodes

D8.2.1 Final Report on the EMMA Technology Road Show

D8.3.1 EMMA Research Archive: All papers written in the project lifetime

Milestones and expected result

MS   D8.1.1   On-line demonstration of the EMMA system at three partner nodes

B.7 Other issues

B.7.1 Ethical issues

Where the EMMA tools involve the disclosure of personal information this will be based on a positive opt-in procedure and more generally in full conformance with the relevant data protection and privacy laws.

Typically, recommender systems (such as collaborative filtering systems) require part of the users' activities and interests to be captured, processed and shared. This clearly raises privacy issues. We will be addressing these issues by the following means.

- Firstly, we will ensure that users are aware of any monitoring.

- Secondly, we will allow users to control the acquisition and processing of data, e.g., by designing and prototyping software tools such that users at any time can turn off any data acquisition mode.

- Thirdly, often it is sufficient to provide knowledge about the fact that someone (or, a certain group) has seen and/or acted with an item without revealing the person's identity (e.g., Amazon's "Other users are also shopping for these items"). Therefore, we will make use of anonymous recommendations wherever possible.

Ethical issues checklist

Table A. Proposers are requested to fill in the following table

Does your proposed research raise sensitive ethical questions related to:	YES	NO
• Human beings		x
• Human biological samples		x
• Personal data (whether identified by name or not)	x	
• Genetic information		x
• Animals		x

If you answer "YES" to any of the above, please include in your proposal section B7.1 the more detailed version of Table A ("Crucial information") obtained from:

http://europa.eu.int/comm/research/science-society/ethics/rules_en.html

Table A. Crucial Information

Please indicate whether the proposal involves	Yes	No	Uncertain

Research on human beings		X	
• Persons not able to give consent		X	
• Children		X	
• Adult healthy volunteers		X	
Human biological samples		X	
• Human foetal tissue/cells		X	
• Human embryonic stem cells		X	
Human embryos		X	
Human genetic information		X	
Other personal data		X	
• Sensitive data about health, sexual lifestyle, ethnicity, political opinion, religious or philosophical conviction		X	
Animals (any species)		X	
• Non-human primates		X	
• Transgenic small laboratory animals		X	
• Transgenic farm animals		X	
• Cloning of farm animals		X	
Research involving developing countries (e.g. clinical trials, use of human and animal genetic resources…)		X	
Dual use		X	

Table B. Proposers are requested to confirm that the proposed research does not involve:

- Research activity aimed at human cloning for reproductive purposes,
- Research activity intended to modify the genetic heritage of human beings which could make such changes heritable
- Research activity intended to create human embryos solely for the purpose of research or for the purpose of stem cell procurement, including by means of somatic cell nuclear transfer.

	YES	NO

Confirmation : the proposed research involves none of the issues listed in Table B		X

B.7.2 Gender issues

All those involved in EMMA, both the researchers and those taking part in the application trial, work for Equal Opportunities Employers. As such, none of the deliverables will be subject to bias in terms of gender. The table below shows the gender breakdown of key staff scheduled to work in the EMMA project.

	Male	Female	% of Female to Male
Senior Researcher	19	6	24%
Researcher	5	4	44%
Other	5	2	29%
Total	29	12	29%

Further more all user trials are designed to ensure that gender differences are documented for follow-up development of the user interface.

B.7.3 Other EC-policy related issues

Societal implications, cultural expression, educational synergies

EMMA focuses on cultural interaction and storytelling through a software tool, whereby users will be engaged in a discourse with cultural artefacts and information, creating, thus, multi-layered annotations of culture that are informed by different cultural communities' perceptions and ideas about self and other. In order to promote an inclusive European information society, EMMA will engage, model and help express the viewpoints of diverse, and sometimes less privileged, communities, empowering them through interaction and participation in the construction of meaning. EMMA focuses on empowering the European citizens – the members of the diverse cultural communities of Europe – as pivotal agents for the construction of cultural meaning, through discourse and interaction with cultural assets, which are organised in narrative and syntactic compositions that are aligned with the "deep structure" of European culture.

The mechanisms and tools formulated by EMMA will, of course, be hopefully useful not only in cultural heritage communication, but in all other domains of digital communication where it is important that complex knowledge is communicated through meaning structures – narratives, descriptions, arguments – that are familiar to particular communities of users, and thus may contribute in a broader sense to establishing a more usable, useful information society.

Annex 1: Detailed partner descriptions and CVs

Salzburg Research Forschungsgesellschaft m.b.H (SRFG)

Partner Description

Salzburg Research Forschungsgesellschaft m.b.H (SRFG) is the non profit research organisation owned by the State of Salzburg. It is located at the Salzburg Techno Z, the regional technology park, which is one of the largest information technology incubators in Europe.

The company employs about 65 RTD and organisational support staff, and has expertise in knowledge and content technologies (e.g. Semantic Web, knowledge-enhanced content, tools for knowledge workers); middleware architectures, object-oriented programming, component-based software development, and quality-based internet technology. Socio-economic innovation and impact studies in areas such as e-learning and digital culture/heritage complement and inform this RTD.

Furthermore, SRFG has in-depth expertise in project coordination as demonstrated in several successful EU-projects. SRFG application development areas include advanced content and knowledge management, eCulture, eTourism, and technology enhanced learning (EduMedia).

SRFG also offers consulting services to local, national and European organisations. Clients are mainly public bodies such as governments, public administration, libraries and other educational and social institutions. SRFG co-operates with private companies in pre-competitive research & development projects. Partners include Telekom Austria, Software AG, Sun Microsystems, and a number of national SMEs. Website: www.salzburgresearch.at

Key Staff

Dr. Sebastian Schaffert (Senior Researcher)

Dr. Sebastian Schaffert has been a senior researcher at the group for knowledge based information systems at Salzburg Research since August 2005. Before, he was a research and teaching assistant at the Institute for Informatics, University of Munich, Germany. He received his PhD from the University of Munich with a dissertation entitled "Xcerpt: a rule-based query and transformation language for the Web". His research interests are in Web and Semantic Web research, context adaptation, XML and semi structured data, functional and logic programming, as well as Open Source Software. He has contributed to many scientific conferences as author and program committee member and has several publications on the rule-based XML query language Xcerpt and related topics. He is the maintainer and primary author of a rather successful Open Source project called JWebMail. Sebastian Schaffert is currently also involved in the Network of Excellence REWERSE.

Mag. Wernher Behrendt, MSc (Senior Researcher)

Wernher Behrendt is a Senior Researcher working on multimedia middleware and on semantic interoperation between heterogeneous information systems at the group for knowledge based systems at Salzburg Research. He holds an MSc in Cognitive Science from Manchester University and has been working in near-to-market IT research since 1989. From 1989 to 1995 he was a Senior Research Associate in the Informatics Department at

Rutherford Appleton Laboratory (UK), working on embedded knowledge based systems in distributed multimedia presentation systems. From 1995 to 1998 he was a Senior Research Associate at Cardiff University (UK), working on interoperation between heterogeneous information systems. There, he investigated the use of logic programming for the construction of two-way translators between different data models. From 2000 to now, Mr. Behrendt has been senior researcher at Salzburg Research. Since 2003 he has been leading the Knowledge Based Information Systems group (KIS) of SRFG. Mr Behrendt held courses for Computer Science and he has worked on projects ranging from software engineering methods and quality assurance to legacy system reengineering using migration methods and distributed systems middleware.

Dr. Guntram Geser, MTM (Senior Researcher)

Dr Geser is Head of Information Society Research at Salzburg Research, Austria. In the eCulture domain his recent work includes the strategic study DigiCULT: Technological Landscapes for Tomorrow's Cultural Economy (2001) and DigiCULT Forum (2002-2004), the 'technology watchdog' for the European cultural heritage sector (www.digicult.info). He also co-authored the strategic study EP2010: The Future of Electronic Publishing Towards 2010 (Sept. 2003) for the European Commission's Directorate-General for the Information Society (http://ep2010.salzburgresearch.at). Dr Geser studied Communication and Political Science at the University of Salzburg and Telematics Management at the Donau-University Krems. Before joining Salzburg Research, he lectured at the University of Vienna on science journalism and served as media consultant for the Austrian Cultural Service. Dr Geser worked on research projects in the fields of media history and cultural studies in Berlin (Technische Universität; Deutsche Film- und Fernsehakademie) and Amsterdam (Instituut for Film- en Televisiewetenschap; Nederlands Filmmuseum). He also has close working relationships with the Austrian Film Archive (Vienna), and co-edited a volume on the famous Austrian silent movie 'City without Jews, G. Geser/A. Loacker (Hg.): Die Stadt ohne Juden. Film Archiv Austria, Edition Film und Text 3, 2000

Robert R. Mulrenin, BS, MS (Senior Researcher)

Bob Mulrenin is a senior researcher and software developer with expertise and experience in knowledge / Semantic web technologies, State-of-the-Art Knowledge-based eLearning applications , metadata standards in Cultural Heritage, electronic publications, contextualisation & visualisation using knowledge / Information Retrieval technologies. He has been in involved in IST projects involving Cultural Heritage and Knowledge based projects.

He has a diverse background in the sciences including Zoology, Molecular Biology, and Confocal Laser microscopy; and work experience in medical research. He was also the Systems Manager of clinical research (a National GCRC center) at New England Medical Center, Boston. And supported proposal evaluation, and system and software support.

Mag. Andrea Mulrenin, MA (Senior Researcher)

Andrea Mulrenin leads the Applied eCulture Group at Salzburg Research, Austria. Recent projects in the eCulture domain include the strategic study DigiCULT: Technological Landscapes for Tomorrow's Cultural Economy (2001); DigiCULT Forum (2002-2004), the 'technology watchdog' for the European cultural heritage sector; and a survey on Digital Cultural Heritage Networks commissioned by the Council of Europe (2004). Currently, Mrs

Mulrenin is leading the Austrian Digital Cultural Heritage Initiative project, MINERVA Plus (2004-2005), which Salzburg Research is carrying out on behalf of the Austrian Ministry of Education, Science and Culture; see the project's Website: http://www.digital-heritage.at/. Some recent publications in the area of eCulture include: A. Mulrenin (ed.): The DigiCULT Report. Technological Landscapes for Tomorrow's Cultural Economy. Luxembourg: European Commission, 2002, available online: http://www.digicult.info/pages/report.php; Survey on Digital Cultural Heritage Networks. April 2003, http://www.european-heritage.net/sdx/herein/doc_dcn/dcn_presentation.xsp; see also her articles on digital cultural heritage policy and technology issues in: eCulture, Vol. 3/2002, issues 1, 2 and 4, http://www.cordis.lu/ist/ka3/digicult/newsletter.htm

Dipl.Ing (FH) Rupert Westenthaler (Researcher)

Rupert Westenthaler is working as researcher and software developer in the Knowledge based Information Systems Group at Salzburg Research. He holds an DI(FH) in Telecommunications Engineering from the University of applied science in Salzburg (June 2000) and has three years of experience in near- to-market IT research. As a member of the technical team of Salzburg Research, he has been actively conducting research in the area of middleware systems, semantic web and knowledge management. Recent projects included CULTOS (European research project) - design and development of knowledge based multimedia authoring tools, METOKIS (European research project) - design and development of a middleware for knowledge sharing and on a national project designing and developing a recommendation engine. In addition, he is working on RDF-Gravity, a Java-based visualization tool for RDF graphs (available at http://semweb.salzburgresearch.at/apps/rdf-gravity/).

John Pereira, BA (Project Manager)

John Pereira is a project manager at Salzburg Research. He graduated from the University of Wollongong, New South Wales, Australia in 1996 with a double major BA in Industrial Relations and Legal Studies. Recently he completed a certified E-Business Manager programme from the Donau University in Krems, Austria. Prior to joining Salzburg Research he was Customer Relations Manager within the Northern Division at Sony DADC. At Salzburg Research, Mr. Pereira has been involved in the successful marketing and organisation of a European-wide multimedia contest (EuroPrix MultiMediaArt), which included organising relevant conferences, exhibitions, and seminars that promote best practice in digital content publishing. In 2001-2002, he managed a pilot project with SES Astra to provide satellite based interactive television to SMEs for education and training. He was project manager of the DigiCULT-Forum (2002-2004), an EU funded initiative to provide mission-critical information in the selection and use of digital technologies for Europe's heritage organisations.

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Projects

- **CULTOS** - Cultural Units of Learning, Tools and Services (IST RTD-project (2001-2003)); role of Salzburg Research: Co-ordinator. CULTOS developed knowledge-aware multimedia authoring and presentation tools for non-technical experts, for cross-media integration of cultural multimedia artefacts. http://www.cultos.org/

- **VICODI** - Visual Contextualisation of Digital Content (IST RTD-project (2002-2004)); role of Salzburg Research: Contractor. VICODI enhanced human comprehension of digital content on the Internet by contextualising the content with the help of ontologies and semantic indexation - the application domain was History. http://www.vicodi.org

- **EP2010** - The Future of Electronic Publishing Towards 2010 (study (2002-2003)); role of Salzburg Research: Single contractor. EP2010 trends in research, development, and usage of new technologies for future publishing products and services. The recommendations of the study were used as decision support for the Commission's activities within the 6th Framework Programme. The study indicated ways forward to foster the convergence of knowledge and content technologies. http://ep2010.salzburgresearch.at/

- **METOKIS** (IST FP6 Call 1, Jan 2004-Oct 2005; role: Coordinator) In METOKIS, we will create a prototype "knowledge content carrier architecture" that enables the

exchange of advanced content objects (Knowledge Content Objects - KCOs). These objects combine multimedia resources with semantic annotations whose vocabulary is derived from ontologies. The semantic annotations are enhanced by task-related concepts, so as to provide an operational context for each content object. http://metokis.salzburgresearch.at/

- **DigiCULT Forum** (IST FP5 March 2002 – December 2004; role; Coordinator) DigiCULT Forum has provided a technology watch mechanism for the cultural and scientific heritage sector in Europe and beyond. Backed by a network of peer experts, the project has monitored, discussed and analysed existing and emerging technologies likely to benefit the cultural and scientific heritage sector. To promote the results and encourage early take-up of relevant technologies, DigiCULT has published seven Thematic Issues and three in-depth Technology Watch Reports, and presented the DigiCULT.Info ejournal to a growing community. http://www.digicult.info

- **REGNET** – Cultural Heritage in Regional Networks FP5 IST RTD-project (2001-2003). Role of SR: Partner. REGNET set up a functional network of cultural service centres throughout Europe which provided IT-services to cultural heritage organisations and facilitated e-business activities of these organisations. A technical and legal framework for such a service infrastructure was developed. Among the objectives were the development of an infrastructure for B2B and B2C transactions, the integration of a distributed search and retrieval system to achieve a "virtual union catalogue" and the development of a legal framework necessary for business transactions. Salzburg Research was responsible for designing and implementing the electronic publishing component. The component enables non-expert end users to generate publishing products and to extract existing information from the repositories available in the REGNET system. http://www.regnet.org

- **COVAX** – Contemporary Culture Virtual Archives in XML FP5 IST RTD project (2000-2001). Role of SR: Partner. The objectives of COVAX were to combine document descriptions and digitised surrogates of documents from libraries, archives and museums, to build a global system for search and retrieval, achieving accessibility to primary source documents regardless of their physical location via the Internet. Salzburg Research developed the software to perform XML delivery, transformation and publication of heterogeneous document types appropriate to either user preferences or to the underlying domain of the document. Salzburg Research's electronic publications solutions include dynamic publication of heterogeneous document types from a query result set and the advanced dynamic transformations of any source metadata document into a Dublin Core publication. http://www.covax.org

- **MINERVA PLUS** (Ministerial NETWORK for Valorising Activities in digitisation PLUS) Co-ordination mechanism , IST accompanying measure (2004-2005), Role of SR: Partner. Short description: The project has the overall objective to promote the creation of National Committees to discuss, correlate and harmonise activities carried out in the digital heritage sector. It promotes and establishes contacts between international organisations, associations, networks and projects involved in the sector of digitisation of cultural and scientific content. The project is based on the principle of embeddedness in national digitisation activities, guaranteed by the direct involvement of the national Ministries of Culture who participate in Minerva and MinervaPLUS. http://www.minervaeurope.org

- **Digital Cultural Heritage Networks Survey for the Council of Europe**, finished 04/2003. Role of SR: single contractor. Autors: Andrea Mulrenin, Mark Markus, Birgit Retsch (2003): In December 2002, representatives of European digital cultural

heritage networks and projects met in Strasbourg at the Council of Europe to consult with council members on the most pressing issues related to the rapidly growing amount of digital cultural assets. One of the major problems identified has to do with the fragmented and in many respects uncoordinated approach of networks and projects concerned with digital cultural heritage. Many initiatives work in parallel on the same or related problems with little exchange. Especially at the crossdomain level, information exchange and co-operation has not yet reached the desired degree to avoid double work and to ensure the most effective use of the anyway limited financial resources available to the cultural heritage sector. Therefore, the participants of the Strasbourg meeting decided to conduct a survey of networks to get a substantiated view on who is doing what and at which level in the European digital cultural heritage sector. The survey should finally help to identify those visionaries, opinion leaders and decision makers from digital cultural heritage networks that should be further involved in the Council of Europe consultation process on digital cultural heritage. Salzburg Research, eCulture Group, was commissioned to conduct the survey which was made available in April 2003. Online database: http://www.european-heritage.net/sdx/herein/doc_dcn/dcn_presentation.xsp

- **DigiCULT** – **Technological Landscapes for Tomorrow's Cultural Economy**. Strategic study 2001 for the EC DG Information Society, Unit D2. Role of SR: single contractor. The study provided an orientation for archives, libraries and museums (ALMs) all over Europe with respect to the integration of information and communication technologies (ICTs) into these institutions' working fields. State-of-the-art technologies, content, cultural services, and applications as well as user demands were investigated. Another focus was to describe and analyse chances, financial aspects, legal background, and policies setting the framework for the cultural institutions. Future scenarios of the technological development in the ALM sector were elaborated. Finally, recommendations on measures to be taken in order to exploit the opportunities and to overcome current technological impediments both to players in the ALM sector and policy makers were given. http://digicult.salzburgresearch.at; http://www.digicult.info/pages/report.php

- **The Austrian Digital Heritage Initiative Project** commissioned by the Austrian Federal Ministry for Education, Science and Culture. Role of Salzburg Research: Single contractor (11/2003 – 02/2005) The Austrian Initiative for Digital Heritage was carried out as part of the eFit Austria programme of the Federal Ministry for Education, Science and Culture and was implemented by Salzburg Research. In particular, Salzburg Research developed an online portal providing comprehensive bilingual (German and English) information on digitisation activities and projects in Austrian museums, archives, libraries and other cultural heritage institutions. The portal is the national reference and information point for digitisation projects, programmes and initiatives which are conducted in the framework of the European Minerva project. Further activities which were carried out by Salzburg Research include several presentations of the Austrian Digital Heritage Initiative at major national events and cultural heritage institutions, such as BAM (the umbrella organisation for the Austrian libraries, archives, and museums) and the Austrian National Archive (March 2003); the Austrian National Library (March 2003), the State Library of Vorarlberg, as well as the Koop-Litera Conference at the State Library of Lower Austria (May 2004). In addition, Salzburg Research presented the initiative at the Meeting of the German Museums Association/ICHIM04 Conference at the Haus der Kulturen in Berlin (August 2004), as well as at the eCulture Symposium 2004 (September 2004). Further information: http://www.digital-heritage.at

Centrum voor Wiskunde en Informatica (CWI)

Partner Description

CWI is the research institute for mathematics and computer science research in The Netherlands. CWI has an outstanding international reputation, is an ERCIM member, and is also strongly embedded in Dutch university research. The Multimedia and Human-Computer Interaction group (INS2), part of the Information Systems cluster (INS), is renowned for its innovative work on all aspects of automated and semi-automated multimedia presentation authoring and presentation generation. Results of this work include the Amsterdam Hypermedia Model, contributions to the W3C SMIL 1.0, SMIL 2.0, and XHTML recommendations, the hypermedia authoring system GRiNS, and the CWI spin-off company Oratrix. Members of the group have been active in W3C's XHTML and SYMM Working Groups and ISO's MPEG7 DDL Working Group. Members of the group are currently participating in the W3C Semantic Web Best Practices group which aims to provide use-cases for developers of Semantic Web applications. The group receives funding from national as well as international research projects, such as the cultural heritage based NWO projects I2RP, NASH and CHIME, the large Dutch funded MultimediaN project, the Dutch project Passepartout (as part of the European ITEA Jules Verne project) which includes strong industrial support from Philips; members of the group are currently affiliated with the European Network of Excellence on Digital Libraries (DELOS).

Key Staff

Prof. dr. Lynda Hardman (Senior Researcher)

Prof. dr. Lynda Hardman is the head of the Multimedia and Human-Computer Interaction group at CWI and part-time professor at the Technical University of Eindhoven. She obtained her PhD from the University of Amsterdam in 1998, having graduated in Mathematics and Physics from Glasgow University in 1982. During her time in the software industry she was the development manager for Guide - the first hypertext authoring system for personal computers (1986).

She was a member of the W3C working group that developed the first SMIL recommendation. The research projects she currently leads focus on different aspects of the automated generation of hypermedia presentations mainly in the domain of cultural heritage, with emphasis on aspects of design and on underlying Web technologies.

Dr. Jacco van Ossenbruggen (Senior Researcher)

Dr. Jacco van Ossenbruggen is a senior researcher at CWI, currently working in the Multimedia and Human-Computer Interaction group. He obtained his Ph.D. in computer science from the Vrije Universiteit Amsterdam. With a background in software engineering, his current interests include synchronized multimedia on the Semantic Web and the automatic generation of user-tailored hypermedia presentations. He was a member of the W3C SYMM Working Group that developed the SMIL 1.0 and SMIL 2.0 Recommendations.

Dr. Frank Nack (Senior Researcher)

Dr. Frank Nack is a senior researcher at CWI, currently working in the Multimedia and Human-Computer Interaction group. He obtained his Ph.D. with a thesis on "The Application of Video Semantics and Theme Representation for Automated Film Editing," at Lancaster

University, UK. The main thrust of his research is on the representation, retrieval and reuse of media in distributed hypermedia systems, educational hypermedia systems that enhance human communication and creativity, computational assistance for the development, maintenance and usage of hypermedia systems and distributed hypermedia systems, computational applications of media theory & semiotics, automated video editing, interactive storytelling, and computational humour theory. He was a member of the MPEG-7 standardization group where he served as the editor of the Context and Objectives Document and the Requirements Document, and chaired the MPEG-7 DDL development group. He is on the editorial board of IEEE Multimedia, where he edits the Media Impact column ands also serves as associated editor in chief.

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Projects

- **Dynamo** (Semi-automatic Hypermedia Presentation Generation): The main goal of this NWO-funded project is to increase the level of automated adaptation of varying user and system characteristics during the process of creating hypermedia presentations. User adaptation might cover such things as the current state of knowledge of the user, the task the user is involved with and characteristics and preferences of the user. Adaptation at the system level includes accounting for the end-user system the presentation will be played on, the network bandwidth between the server generating the source document, the servers supplying the media items and the hardware at the client side, etc. http://homepages.cwi.nl/~media/Dynamo/

- **CATCH/CHIP** (Cultural Heritage Information Presentation): The cultural heritage collections and relevant related contextual information are distributed over many different institutes. CATCH aims to make the barriers between these institutes disappear by providing virtual integration of these collections. The CHIP project focuses on the interaction of the users with the combined cultural heritage content, and in particular on personalized presentation and navigation. Cultural heritage information (digitized versions of cultural artifacts as well as descriptive information)

is used by a wide variety of user types, ranging from schoolchildren to professional art experts (including museum curators and researchers). There have already been initiatives within the cultural heritage sector to provide information in a variety of formats ranging from websites and leaflets (printed on demand) to audio tours. The CHIP project aims to give attractive presentations of this information in a way that is appropriate for the actual user, and that is presented in a form suiting the user's characteristics, his usage context and his computing and communication equipment. In addition the scope of the CATCH project gives the unique opportunity (and challenge) to make presentations that span several collections and background information from libraries, museums and potentially broadcasters and magazines and newspapers. Through the use of portable devices the personalized information can not only be offered on the Web but also inside museums, using the user's location in addition to all the other information about the user for performing the automatic personalization. http://www.chip-project.org/

- **DELOS**: Activities within the DELOS Network of Excellence on Digital Libraries funded by the EU's Sixth Framework Programme started on January 1, 2004. Digital Libraries (DL) have been made possible through the integration and use of a number of IC technologies, the availability of digital content on a global scale and a strong demand for users who are now online. They are destined to become essential part of the information infrastructure in the 21st century. The DELOS network intends to conduct a joint program of activities aimed at integrating and coordinating the ongoing research activities of the major European teams working in Digital Library - related areas with the goal of developing the next generation Digital Library technologies. http://www.delos.info/

- **MultimediaN**: NL OC&W funded BSIK project from ICES-KIS money. INS2 is in the N9c e-culture project of MultimediaN. Despite the amounts of public funding devoted to both cultural heritage and ICT infrastructure, online access to even the most important aspects of our past is still limited and highly fragmented. The objective of this project is the development of a set of e-culture demonstrators providing multimedia access to distributed collections of cultural heritage objects. The demonstrators are intended to show various levels of syntactic and semantic interoperability between collections and various types of personalized and context--dependent presentation generation. The demonstrators will all be developed as components of the portal cultuurwijzer.nl of DEN (Foundation Cultural Heritage Netherlands). This portal will serve as a joint application domain for the demonstrators. The portal provides access to a relatively large set of key culture-heritage collections in The Netherlands. The demonstrators will typically focus on subsets of the collections to demonstrate the use of semantic interoperability, semantic information access and visualization, and context-specific presentation generation. The project integrates results from computer science in the areas of: semantic Web technology, multimedia indexing and search, and web interfacing and data visualization to facilitate display of (part of) our cultural heritage. The team combines a balanced mix of internationally renowned academic expertise on Semantic Web and multimedia technology with industrial strength experience in Web design and user interface development. http://www.multimedian.nl/

- **Nash**: Nash aims at improving structured adaptive hypermedia presentations on the Web by combining Semantic Web, Adaptive Hypermedia and Multimedia Database technology. Research builds on top of the infrastructure provided by Eindhoven's HERA project and CWI's Cuypers testbed. http://db.cwi.nl/projecten/project.php4?prjnr=143

- **OntoWeb**: Currently computers are changing from single isolated devices into entry points into a worldwide network of information exchange and business transactions. Support in data, information, and knowledge exchange is becoming the key issue in current computer technology. Ontologies will play a major role in supporting information exchange processes in various areas. They will enable the semantic web which provides on-line access to large volumes of information and knowledge based on machine-processable semantics of data. In consequence, there is a large interest in these topics from various sites. Different research communities develop their subject into this direction; many commercial agents encounter the economical potential of the topic and many funding agencies are willing to provide significant support for its development. Still the different communities are scattered and have not yet found enough interactions to fully employ the potential of this new technology. It is the delighted goal of the OntoWeb network to bypass communication bottlenecks between these various and heterogeneous interest groups. Ontoweb is submitted as a thematic network proposal to the European commission. http://www.ontoweb.org/

- **Passepartout**: The availability of hundreds of media signals offers interesting challenges for applying user profiles, personalization and adaptive user interfaces. However, the user risks getting lost in this great flood of possibilities. We need solutions to help the user make good choices from this enormous selection. Philips is developing Blu-Is as a possible solution for this problem. The Dutch Passepartout project researches frameworks for Ambient Intelligence via Blu-Is in combination with the Mass-Customization Box. Dutch Passepartout also researches potential applications of this. This research is carried out in cooperation with Philips PDSL and the international Passepartout partners. The core of the Passepartout project is researching the automatic generation of personalized suggestions using dynamically built user profiles so that the user always has control over the Mass-Customization Box and how it finds interesting content from the enormous availability. This personalized advice makes content available on TV screens, projectors or portable devices and players in a wireless in-home network. Passepartout also researches mechanisms in this framework for incremental authoring of content on top of the existing broadcast content and its subsequent components with other participants via the Internet and video chat groups. The system continually and automatically updates the user profile during long-term monitoring of the user's program choices and interactions. In addition, Passepartout researches the user of standards such as SMIL, MPEG4/7, SVG and XMT as the basis for a new form of content distribution and peer-to-peer sharing environments (P2P). http://www.hitech-projects.com/euprojects/passepartout/

- **CHIME**: The goal of the CHIME project is to investigate the use of semantic models for tailoring the presentation of cultural information extracted from existing repositories to different types of users. While database query and full text search interfaces are able to provide access to the information, they do not take into account the richness of expression of multiple media types. In this project we will build on the presentation generation framework developed in previous ToKeN2000 work and focus on the user and domain modelling aspects, paying particular attention to the knowledge representation problems introduced by multimedia aspects. The research in the project will concentrate on the creation of ontological descriptions of the domain which can be revealed in different levels of detail to different users, on the creation of user profiles to facilitate both this process and the hypermedia presentation generation process. Experience gained in the use of the user profiles and domain ontologies

during the presentation generation process can then feed back into their development.
http://homepages.cwi.nl/~media/projects/CHIME/

- **I2Rp**: The work of CWI will focus on the presentation aspects of personalized, media-centric hypermedia-interfaces. The Cuypers proof-of-concept prototype, constructed in the first phase of ToKeN2000, currently focuses on the adaptation of hypermedia presentations to various end-user devices. For example, a desk-top computer, a hand-held device or a mobile phone. This device-driven approach was developed to validate our constraint-driven approach to hypermedia presentation generation. In the following phase of ToKeN2000, the device-driven approach will be integrated with a more user-centric approach, based on explicit user profile information. In order to adapt hypermedia presentations to an individual user's task and preferences, adequate user models need to be developed. Research to address this issue will be carried out in cooperation with KI/RUG in the context of the Optima project. To be able to convey the results of a multimedia database query to a user effectively, the individual multimedia objects need to be related by placing them in the context of a unified hypermedia presentation. This process of enriching the database content requires a number of steps. First, research is needed into appropriate rhetorical and narrative discourse structures to guide the overall flow of the presentation. Second, research is needed into the process of mapping the discourse structures onto hypermedia presentation patterns. This process is driven by high-level hypermedia design rules which also have to be developed. Finally, research is needed into the realization of these hypermedia patterns in terms of a concrete hypermedia presentation format driven by lower-level design rules and qualitative and quantitative presentation constraint processing (DISC is the discourse-driven Cuypers extension).
http://www.ai.rug.nl/alice/i2rp/

- **Topia**: The Topia project is developing a system that generates presentation structure around media objects returned from semantic-based queries. Current developments in three research areas -- semantic annotations, narrative structure and hypermedia presentation -- form three phases in one document processing chain. Emerging and established Semantic Web technologies provide computable descriptions of archived media. Formalized components of narrative theory serve as the basis for computer-generated and computable structure defining the structured progression of presentations. Hypermedia presentation devices for these narrative constructs guide the programming of transforms from structured progression over media to hypermedia presentations. This project's system will automatically process Semantic Web annotations for media into structured progressions that in turn transform into hypermedia presentations. http://topia.demo.telin.nl/.

Consiglio Nazionale delle Ricerche, (ISTC-CNR)

Partner Description

The "Consiglio Nazionale delle Ricerche" (CNR: National Research Council) is the technical body for basic and applied research of the Italian Ministry for Universities and Research. It is also in charge of the preparation of standards of national interest and manages special pluri-annual grants for projects on various focused topics, following the policy directions of the Council of Ministries. It is organized in about 100 autonomous institutes, employing about 5000 researchers, and addresses all the branches of sciences and humanities.

The Institute of Cognitive Science and Technology (ISTC) of the Italian National Research Council (CNR) is the most important Italian research institution for Cognitive Science with

more than 60 scientists involved in highly interdisciplinary research merging cognitive and social sciences, linguistics, artificial intelligence, and knowledge engineering. The ISTC has a long history of participation in projects from European Framework Programmes in the cognitive, engineering, and social sciences.

The Laboratory for Applied Ontology (LOA) is a centre specialized in the ontological foundations of conceptual modeling, currently hosting about 20 researchers including seniors, researchers, and temporary positions. LOA explores the role of ontologies in different fields such as knowledge engineering and representation, database design, information retrieval, natural language processing, the Semantic Web. The group is characterized by a strongly interdisciplinary approach that combines Computer Science, Philosophy and Linguistics. On the application side, it is active in information systems for law and medicine, enterprise modeling, integration of lexical resources, electronic commerce, and information extraction. LOA has been part of several European projects (NoEs, STREPs, EUREKAs, and IST projects) and has considerable experience in managing EU-funded projects. LOA has participated in ESPRIT projects: GALEN and GALEN-II (1992-1998), EUREKA project IKF (2000-2004), IST FP5 projects OntoWeb (2001-2004) and WonderWeb (2002-2004), and IST FP6 projects METOKIS (2004-2005) and Semantic Mining (2004-2006).

Key Staff

Nicola Guarino (Senior Researcher)

Nicola (1954, senior research scientist) leads the Laboratory for Applied Ontology (LOA) in Trento. He graduated in Electrical Engineering at the University of Padova in 1978, with a thesis on biomedical engineering. In 1979–1984 he was responsible of the data acquisition and monitoring system of a large nuclear fusion experiment at the Institute of Ionized Gas (IGI-CNR) in Padova. He then moved to the area of knowledge representation, joining the CNR Institute of Systems Theory and Biomedical Engineering (LADSEB-CNR) to work initially on medical expert systems. He moved to ISTC-CNR in 2003, to co-found the new lab for applied ontology in Trento.

He has been active in the ontology field since 1991, developing a strongly interdisciplinary approach that combines together Computer Science, Philosophy, and Linguistics, and relies on Logic as a unifying paradigm. He has played a leading role in promoting a well-founded ontological approach within the Computer Science community. He has been involved in various ontology-related projects, including the European project WonderWeb (development of a library of foundational ontologies for the Semantic Web), and a project on Modeling Trust and Security Relationships in Organizations funded by the Province of Trento (MOSTRO).

He is general chair of the FOIS conference series, associate editor of the International Journal of Human-Computer Studies and the Journal of Data Semantics, and editor-in-chief (with Mark Musen) of the new Journal of Applied Ontology. He is a member of ACM, AAAI, and AI*IA.

Aldo Gangemi (Senior Researcher)

Aldo (1962, Research Scientist) graduated in Philosophy (Analysis of Scientific Languages) from the University of Rome in 1989. His research interest is in the fields of ontology engineering and cognitive semantics. He is active in ontology engineering and conceptual modelling since 1992, and pioneered the use of ontologies for terminology re-engineering. He

has been involved in national and international projects on medical informatics, business intelligence, legal and agricultural ontology and catalogue building. He is author of 70+ scientific papers in journals and conferences, gives regular international lectures and presentations, is a regular program member/chair of conferences and workshops, and a consultant for several companies. Aldo co-ordinates the International Working Group on Legal Ontologies, a W3C task force on lexical ontologies, and the participation of ISTC-CNR in national and international projects, including also the FP6 projects METOKIS, and the forthcoming NeOn.

Jos Lehmann (Senior Researcher)

Jos (1971, Research Scientist) works on various themes in knowledge representation (e.g. (legal) ontology, causation, plans, collectives) as well on various EU and national projects. In December 1995 he received a Master's Degree by the University of Milan, Faculty of Philosophy, for a thesis on the logical and epistemological aspects of the Frame Problem in Artificial Intelligence. After a couple of years in the private sector, he worked as a junior researcher at the University of Amsterdam, Faculty of Law, Department of Computer Science and Law - Leibniz Center for Law (1998-2003). In March 2003 he received a Ph.D. Degree by the University of Amsterdam for a dissertation on the problem of Causation in Artificial Intelligence and Law.

Alessandro Oltramari (Senior Researcher)

Alessandro (1976) received a master degree in Philosophy at the University of Padova in 2000. He has been a research fellow at LOA since 2000. He is also a Ph.D. student in Cognitive Science at the University of Trento. His work focuses mainly on ontologies of cognitive and affective domain and on interfacing ontologies and linguistic resources. His research interests include cognitive semantics, philosophy of mind, computational linguistics, natural language processing, theory of agents, ontology of cyberspace.

Publications

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Projects

Besides many national – either academic or industrial – projects, the LOA has a longstanding experience in taking part in European research projects (cf. the LOA homepage: http://www.loa-cnr.it), such as IKF Intelligent Knowledge Fusion (EUREKA Project 2235), OntoWeb (Ontology-based information exchange for knowledge management and electronic commerce, http://www.ontoweb.org), FOS (Fishery Ontology Service, with United Nations - FAO), WonderWeb (Ontology Infrastructure for the Semantic Web, http://wonderweb.semanticweb.org), METOKIS (support for knowledge content objects, task and plan models, http://metokis.salzburgresearch.at), Semantic Mining (semantic technologies in biomedicine), and the forthcoming NeOn (Networked Ontologies, starting early 2006, for building a revolutionary platform for ontology lifecycle).

For example, the main objectives of the project WonderWeb (a highly successful project, worded by the EU as having created most of the infrastructure for the future Semantic Web) are:

- The development of a family of ontology languages that extend existing Web standards while maintaining maximum backwards compatibility. The resulting layered architecture provides the necessary flexibility (standardising on a single language is unrealistic in the Web environment) while maximising interoperability.

- The development of a framework of techniques and methodologies that provide an engineering approach to the building and use of ontologies. In particular, techniques will be developed for the semantic integration, migration, reconciliation and sharing of ontologies.

- The development of a set of foundational ontologies covering a wide range of application domains. Each of these ontologies will provide a carefully crafted taxonomic backbone with a sound high level structure that can be used as the basis for the development of more detailed domain ontologies. The integration of existing ontologies with foundational ontologies provides a principled mechanism for the semantic integration of ontologies.

- The development of the comprehensive technical infrastructure and tool support that will be required by real world applications in the Semantic Web. In particular, an ontology server architecture will be developed in order to link new and existing components in an integrated and extensible tool suite. This includes tools for editing, integrating and extracting ontologies as well as services such as persistent storage and reasoning support.

LOA has contributed to the objectives 2. and 3., providing also substantial feedback on the realization of 1. and 4. (e.g. with the innovative proposal of an ontology for software component description and design).

Tools

A set of software components (either in the form of Semantic Web Services or traditional software pieces) for applying reusable ontologies and design patterns is being developed by the LOA.

Knowledge Media Institute, The Open University (KMI)

Company Description

The Open University is the UK's largest and most innovative education and training organisation. It leads the world in the large-scale application of technology to learning. More than 70% of OU students come from an industrial background and remain in full-time employment throughout their studies. The OU has pioneered a system of study - OU supported open learning - that brings its courses and other study materials within the reach of the entire adult population of the UK.

The Knowledge Media Institute was founded in 1995 as a research institute of the Open University. KMI research interests include semantic web, knowledge systems, knowledge management, advanced telematics, intelligent agents, and "learning on demand". KMI has been involved in EU funded projects in the areas of knowledge based systems, knowledge

modelling, applying knowledge systems technology to engineering design and providing knowledge services over the web.

Key Staff

Dr Paul Mulholland (Senior Researcher)

Dr Paul Mulholland is a Research Fellow at KMI. He has been a principal investigator in a number of European and national projects including ENRICH (FP4), CLOCKWORK (FP5) and CIPHER (FP5). His PhD was in the field of cognitive science. His current research interests include organisational learning, computer supported learning environments, information communication technologies and cognitive modelling. Detailed information, including publications can be found at http://kmi.open.ac.uk/people/paulm

Dr Zdenek Zdrahal (Senior Researcher)

Dr Zdenek Zdrahal is a Senior Research Fellow at KMI. He has been a project leader and principal investigator in research projects in the UK, the Czech Republic, and Mexico. He was involved in a number of EU funded projects. In VITAL (Esprit 2 project P-5365) he was responsible for model-based reasoning, in ENCODE (Copernicus 940149), MGT (Copernicus) ENRICH (FP4), CLOCKWORK (FP5) and CIPHER (FP5) he was a principal investigator and the project leader. His research interests include knowledge modelling, KBS in engineering design, reasoning and Web technology. Dr Zdrahal's recent professional activities can be found at http://kmi.open.ac.uk/people/zsdenek .

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Projects

- **Communities of Interest Promoting Heritage of European Regions** (CIPHER) FP5 CEC funded project under the theme "Heritage for All" .in 2002 – 2004 KMi was the project co-ordinator with 5 other partners from around Europe The project aim was to develop innovative technologies and methodologies to support Cultural Heritage Forums, beyond current virtual galleries or museums that allow visitors to investigate cultural artefacts, and produce their own personal and shared spaces. Visitors would be supported by advanced storytelling and visualisation tools. The Cultural Heritage Forums developed during the project were "Irish Cultural and Natural and Heritage", "Nordic Heritage through Storytelling and Historical Artefacts", "Shared Heritage of Central Europe" and "Tradition of technology innovation in South Central England".

- **Creating Learning Organizations by means of Contextualized Knowledge-Rich Work Artefacts** (Clockwork) FP5 CEC funded project in 2000 – 2003 KMi was the project co-ordinator with 6 other partners This project aimed to support knowledge sharing within distributed teams, knowledge reuse within an organization and collaboration and trade between engineering companies. The Clockwork approach combined knowledge-rich dynamical simulation tools, formal documentation and informal design rationale to closely integrate working, learning, collaboration and negotiation, within and between organizations.

- **True Interactivity for Young Viewers of Virtual Broadcast Content via Intelligent Interfaces** (Tiny-In) EPSRC DTI LINK funded project in 2002 – 2005 KMi in partnership with Peppers Ghost Productions and Edinburgh Virtual Environment Centre Univ. Edinburgh Originally a two year project extended for a further 6 months. The overall research objective was to investigate how an interactive narrative engine could create coherent and engaging experiences by intelligently recombining content developed for broadcast. As a test case, we used characters, scenarios and contexts based on the "Tiny Planets" 3D computer animation TV series produced by Pepper's Ghost Productions and shown on Children's ITV.

- **Enriching Representations of Work to Support Organisational Learning** (ENRICH) CEC project funded in the EU FP4 Programme: IT in Learning and Training in Industry in 1998 – 2000 KMi project co-ordinator, 6 other partners The Enrich Project aimed to develop tools and methodologies for integrating working and learning within knowledge intensive organisations. It built upon existing technologies supporting web based collaboration, agents and knowledge modelling. The ENRICH project fostered the use of knowledge-enriched intranets to provide the means for sharing expertise.

Tools

KMI will build on its existing semantic web tools to support collaboration and the coherent presentation of content. Scene Driver supports the organisation of animation content into narratively coherent games for children (Wolff et al 2004). The child can drive the direction of the narrative through the selection of domino-like tiles. The Clockwork Knowledge Manager provided knowledge level and collaboration support for design activities (Mulholland et al 2003; Zdrahal et al 2003). The knowledge models were used to drive the structure of the collaboration environment and the annotation and retrieval of design components. The Community Story Exchange (CSE) used a knowledge level description to automatically structure a collaborative environment for the online sharing of content (Collins et al 2004). This was use to support inter-school collaboration of pupils. The Story Fountain environment was developed to support the semantic exploration of a story archive

(Mulholland et al 2004). Story Fountain was further developed as a general semantic web application for the exploration of heritage (Collins et al 2005) and has been used in conjunction with SMS mobile phones for the specification of interests during a museum visit (Mulholland et al 2005). We have also developed infrastructure tools that can be used within EMMA. Apollo was developed for the browsing and editing of ontologies (http://apollo.open.ac.uk) and the Resource Annotation Tool (RAT) can be used for the annotation of arbitrary web pages using selected ontologies (Wolff et al 2002).

University of Twente (UT) - Human Media Interaction (HMI)

Partner Description

The multi-disciplinary research on information and communication technology of the University of Twente is concentrated in the Centre of Telematics and Information Technology (CTIT). As such it combines knowledge of ICT systems and applications. The Centre has liaisons with large international ICT companies and European research institutes. The Human Media Interaction (HMI) research team of the CTIT, headed by Professor Anton Nijholt, is responsible for the research areas multimodal interaction, content-based multimedia access and multimedia presentation, ambient intelligence, intelligent and social interfaces, and machine learning. Within HMI research is currently being carried out in the following areas which range from truly fundamental to highly application oriented: sensing and interpreting (multi-party) human verbal and nonverbal communication behaviour, annotation tools, models for information fusing, speech and language processing, emotion detection (voice, facial expression), affect in interaction, multimedia indexing, searching and summarization, embodied conversational agents, animation, virtual reality environments for experiments, and education, etc.

HMI participated in various EU research projects on multimedia retrieval such as the 4th framework TAP projects OLIVE, POP-EYE and TWENTYONE and the IST projects ECHO and MUMIS (Multimedia Indexing and Searching Environment). In the 5th FP we are involved in the M4 project on capturing and making accessible information obtained through video and audio in a smart meeting room. In the 6th FP HMI takes part in a successor project (IP AMI on capturing and interpreting human multi-party interaction in a smart meeting room).

In the national context, the group participates in funded projects on information presentation by embodied conversational agents, speech-supported video retrieval, dialogue systems, information extraction and multimodal interaction for collaborative work and decision-support environments. Within these projects HMI has worked together with both technology providers, as well as content owners, such as broadcast archives and news publishers. Whenever appropriate, performance evaluation is done via of participation in international benchmarks for information processing tasks such as TREC, CLEF, TRECVID and TDT.

HMI is involved in five networks sponsored by the EU: the DELOS network of excellence for Digital Libraries, ELSNET, the network for language and speech processing, the FP6 Network of Excellence INTUITION on virtual reality and the FP6 Network of Excellence HUMAINE (Human-Machine Interaction Network on Emotion). HMI is also associated member of the FP6 Network of Excellence SIMILAR on multimodal interfaces.

Key Staff

Dr. D. Heylen (Senior Researcher)

Dirk Heylen has been worked on generating facial expressions for embodied conversational agents and related issues. As a linguist and a computational linguist his primary interest is in applying insights from the study of human-human communication to human computer interaction and providing computation models of h2h communication. In working on embodied conversational agents, his interest has shifted from working on language as such towards nonverbal means of communication and particularly facial expressions. Trained as a linguist, originally, his first concern with generating appropriate expressions for agents is the question: what do real people do in naturalistic situations? Currently he is working on the analysis of multiparty interaction (meeting scenario's) analyzing the verbal and nonverbal means of communication and their relation with decision making (argumentation, agreement, etcetera) in the context of the European AMI project.

He is also working on intelligent tutoring systems that provide appropriate feedback to students, taking into account assumptions about the mental state of the students derived from observing their actions and nonverbal behaviour.

Research Interests:

- Generation of appropriate conversational and emotional signals of embodied conversational agents, made sensitive to the state of the interlocutor (for instance gaze and smiles).
- Determining the interlocutor's state of mind by interpreting verbal and nonverbal cues.
- Reinterpreting classical speech act theory with insights from social psychology and cognitive emotion theories.
- Applying linguistic and psychological theories of human-human interaction to building virtual humans.

Dr. M. Theune (Senior Researcher)

Mariët Theune has a background in linguistics / computational linguistics. Her main interest is multimodal information presentation. The focus of her current research is on the combined generation of speech and appropriate gestures by embodied conversational agents (the ANGELICA project). This also involves the generation of natural prosody. Another, related, research interest is digital storytelling, which not only involves modelling the emotions of agents acting as characters in the story, but also appropriately expressing these emotions in natural, spoken language as generated by a 'virtual storyteller'. Finally, she also works on multimodal presentation in the context of question answering (the IMOGEN project), where the challenge is to present the requested information in the most appropriate and user-friendly way.

Research interests:

- Language generation and prosody.
- Nonverbal communication by means of gestures.
- Digital storytelling.

Anton Nijholt (Senior Researcher)

Anton NIJHOLT is full professor of human-media interaction at the computer science department of the University of Twente, Enschede, the Netherlands. He coordinates the research in this group and is responsible for the development and maintenance of this research area.

Anton Nijholt has been a member of numerous international program committees and has been (co-) author of more than hundred conference papers, journal papers, book chapters and some books. He organized more than twenty-five workshops in the areas of virtual environments, natural language processing, multimodal interactions and ambient intelligence (e.g., at ACM CHI) Anton Nijholt is a member of several international academic advisory boards. Part of his research is conducted in the context of the 6FP project AMI.

Drs. K. Oinonen (Senior Researcher)

Katri Oinonen has graduated with MSc degree on Artificial Intelligence from the University of Amsterdam. After working for the company Sentient Machine Research (SMR), she worked at the Department of Communication Science of the University of Amsterdam to study public response on an mobile multi-media museum guide (EU project SCALEX). For the last few years her main research interest has been interactive storytelling, computational story generation and emotional affective storytelling.

Publications

- M. Theune and D. Heylen and A. Nijholt, Generating Embodied Information Presentations, Multimodal Intelligent Information Presentation, Kluwer Academic Publishers, 2005. Editor O. Stock and M. Zancanaro, pp 47—69, ISBN1-4020-3049-5.

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Projects

- **Augmented Multiparty Interaction** (IST-5Framework) AMI is concerned with new multimodal technologies to support human interaction, in the context of smart meeting rooms and remote meeting assistants. The project aims to enhance the value of

multimodal meeting recordings and to make human interaction more effective in real time. These goals will be achieved by developing new tools for computer-supported cooperative work and by designing new ways to search and browse meetings as part of an integrated multimodal group communication, captured from a wide range of devices.

- **IMOGEN** is funded by the NWO (Netherlands Organisation for Scientific Research) in their Research Programme for Interactive Multimodal Information Extraction (IMIX). In this project we will develop a multimodal information-presentation module combining language, speech and graphics, which can be used in isolation, but also as part of a spoken dialogue system. Various recent usablility studies indicate that the quality of a system's speech output has a considerable impact on users' judgements. A system which expresses itself poorly or which produces unnatural sounding speech will not be evaluated positively, even if the rest of the system is of a high technical quality. Hence, improving output generation is clearly an important step in developing the next generation of multimodal interfaces. The IMOGEN demonstrator will consist of a number of interacting submodules, dealing with text revision, multimodal generation, and speech synthesis. The input to our system will be provided by a question answering system as the result of a user's query.

- **MULTIMEDIAN**. A staggering amount of digital data goes around in the world, as a feed for digital experiences, as the corpus of our collective knowledge, and as a basis for business processing. Increasingly, the digital data stream is composed of multimedia data items, i.e. a combination of pictorial, auditory, and linguistic data. With sufficient bandwidth and computing power at commodity prices, it is obvious that users prefer a multimedia style of information exchange and interaction, including pictures, video, and sound. The emphasis in information handling is shifting from categorical and numerical information to information in multimedia form: Multimedia is the message. In this dynamic, quickly changing world, the objectives of MultimediaN are: To build an outstanding science core and a virtual multimedia lab with a co-ordinated and steerable research plan with strong industry participation; To transfer fundamental and applied science and know-how to the ICT-world; to articulate questions into new research challenges; to demonstrate their use in pilot applications; To reinforce the skill- and innovation-transfer between multimedia research and the market by generating a transparent view on technology by means of demonstrators. MultimediaN is a project funded under the bsik-scheme (Dutch national project)Research groups from: UvA, CWI, TUDelft, TNO, UTwente/CTIT, Telematics Institute, Philips, and IBM, supplemented with over twenty high tech industrial partners, content institutions, and first user groups, among which Van Dale Lexicografie and Nedelands Instituut voor Beeld en Geluid (national broadcast archive). HMI researchers work on spoken document retrieval and semantic multimedia access.

PRC Group

Partner Description
PRC Group - The Management House is a leading provider of integrated professional services to business and institutional clients. It offers consulting and implementation services in the areas of intelligence, relations, communications, innovation and human development. PRC Group provides strategic communications and relationship management services to organisations by helping them identify, acquire, retain and strengthen reciprocal "win-win"

individual relationships with their current and future stakeholders, and uses its expertise in the field of communications, creative design and technology in order to create advanced Internet solutions (organizational portals).

The PRC Innovation Business Unit specializes, among other things, in the conception, design and implementation of Internet-based applications based on semantic complexity of content and on highly segmented user needs and interests, and develops specific public-centric methodologies, including Critical Publics Analysis™, a formal methodology for the definition and understanding of the knowledge and value universe of organisations in the context of their interaction with specific groups of key stakeholders. It has significant applied experience in the field of web information architecture, usability evaluation and design, structured document design and content management using XML, and knowledge organisation using controlled vocabularies, thesauri and topic hierarchies. It has established comprehensive information architecture and design frameworks for electronic press office, corporate communication portals and web archives and exhibition applications. In addition, it has significant expertise in the field of cultural communication and documentation.

Its clients include NGOs such as the International Olympic Truce Centre and public organizations such as the Greek Ministry of Transport, the Greek Ministry of Defence and the Hellenic National Meteorological Service, and blue chip enterprises such as TMI International, the Antenna Media Group, the leading telecommunication provider in Greece, COSMOTE and the Commercial Bank of Greece.

Key Staff

Dr Costis Dallas, Vice-President of PRC Group

He holds Masters' and Doctoral degrees from the University of Oxford. He is currently a Lecturer in the Department of Communication, Media and Culture of Panteion University, and has over 15 years of research and professional experience in hypermedia applications, human factors issues and cultural information systems. He serves as a member of the Steering Committee of Digicult Forum and of the Advisory Committee of ERPANET, and participates frequently as invited speaker in international cultural heritage informatics meetings. He was Head of Documentation and Systems of the Benaki Museum, General Director of the Foundation of the Hellenic World, Special Secretary of the Greek Ministry of Education in charge of libraries, archives and educational technology, and Special Advisor of the Greek Foreign Minister on cultural and information technology issues. He has been co-founder and Executive Vice-President of Hellas Online SA, co-founder and Chairman of the Multimedia Working Group and a member of the Data Standards Working Group of CIDOC, the International Documentation Committee of ICOM.

Pavlos Nomikos, Projects Director and Internet consultant

He holds a BSc in Marketing Management from the American College of Greece and an MBA with focus in Information Systems from SDA Bocconi, Milan, Italy. He started his career in Heliostat SA, a company acting as an evaluator contracted by the European Union, in projects related with the 17th Sector, Alternative Sources of Energy programme, and continued with a consulting position in Ernst & Young, Italy. For the past five years he has worked in London, UK for General Electric as an Information Systems Project Manager and as a Business Manager for iXL, a global e-business consultancy. Throughout his consulting career Pavlos has focused on creating client relationships and leading consulting engagements

in the area of digital media, application development using Internet technologies, and consulting services relating to e-business strategy for clients like British Airways, Lloyds TSB and General Electric.

Vladimir Petrovic, Chief Software Engineer

He studied theoretical mathematics at Belgrade University. He has extensive programming experience in C/C++, Python, Java, Prolog, parallel algorithms, web application development and UNIX systems, and is a international expert on the Z Object Publishing Environment web application server and content management system community. Before joining the PRC Group he was a consultant of LSI Logic, a network UNIX and TCP/IP network administrator of the Electric Power Industry (EPI) of Yugoslavia, and a Research Associate of the Mathematical Institute of Belgrade.

Mihalis Panagiotakis, Senior Consultant

He holds a Bachelors degree in Physics from the University of Athens, a Masters degree in Theoretical Physics from the University of Crete, and has done post graduate work in Physical Chemistry at Florida State University. He has also served as a teaching assistant and laboratory instructor in the Physics department of the University of Crete and in FSU. He has also worked for Crete University Press, and has translated three science books in Greek. His current research is involved with Information Architecture and interface design for multimedia and knowledge portals in the Internet, and usability research methods. He was responsible for Information Architecture for the HNMS (Greek Meteorological Service) site, three Greek government websites, Greek companies' portals and the Salidaa internet archive, among other projects.

Christina Dalla, Consultant

She holds Bachelors degrees in Philosophy from the American College of Greece and in Communication Studies from the University of Bologna, Italy. She also holds a Masters degree in the Philosophy of Mind, World and Knowledge from the University of Reading. During her philosophical studies she focused on semantics and the theoretical possibility of Artificial Intelligence. Her job description focus includes Information Architecture; primarily topic maps and ontologies. She has also worked in the IST Coordination Action CALIMERA as researcher and information architect, organising comprehensive information on technologies, standards, initiatives, key players relevant to the European cultural heritage sector.

Elina Vaki, Consultant

She holds a Masters degree in Visual Culture from the University of Westminster in London and a Bachelors degree in Communication and Mass Media from Panteion University in Athens. She has also attended a 2-year course in Advertising and Public Relations and has worked as a journalist and translator in the cultural section of the Sunday issue of the Kathimerini newspaper. She has also worked in the IST Coordination Action CALIMERA as researcher, identifying the emerging technologies and solutions that are likely to bring the most impact and benefit to cultural heritage organisations and their audiences in Europe and investigating usability issues in the adoption of the new technologies by local cultural organisations.

Paul Davies, Graphic Designer

He holds a Diploma in art and design studies and a BA degree in Graphic design and multimedia from the University of Wales Newport. He has extensive knowledge in multimedia design and in the development and implementation of interactive technologies. He has implemented a broad range of technologies such as Flash interactive elements, Shockwave interactive elements and developed interactive applications utilising audiovisual projections and reactive media. He has also an active interest in the application of interactive media in culture and thus has been involved in many art and experimental exhibitions/movements, ranging from music events to design shows.

Publications

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- Lock, G.R. and Dallas, C.J. (1990), "Compact Disc-Interactive: a new technology for archaeology? " Science and Archaeology 32, pp. 5-14.

Projects

- **CALIMERA** (Cultural Applications: Local Institutions Mediating Electronic Resource Access, www.calimera.org), an IST cultural heritage Coordination Action, involving local cultural institutions (public libraries, museums and archives) across Europe, aiming to improve access to European cultural resources and to generate new forms of learning experiences, with a view to establishing distributed repositories of cultural digital content and community memory within the next 5-10 years. We led on the technical work and convene the industrial pool, whose objective was, firstly, to collect and organise comprehensive information on technologies, standards and research issues relevant to the European cultural heritage sector; and, to identify the key obstacles and drivers in the adoption of technology by local cultural heritage institutions. We also organised a workshop and a conference on Quality Control of cultural web sites and produced the CALIMERA Usability Guidelines, a document which focuses on identifying key issues regarding the usability of cultural web sites and addressing key points which should be taken into consideration by cultural heritage institutions in their effort to design and implement web applications.

- **SALIDAA** (South Asian Arts and Literature Digital Archive, http://www.salidaa.org.uk/, a NOF-Digitise project was undertaken in London in partnership with Adlib Information Systems Ltd., to provide through-the-web hierarchical and subject-based access to a heterogeneous cultural archive, managed according to established archival practice standards and systems. The application combines the capabilities of a web application server and content management system

with a collections management system to provide on-the-fly retrieval and caching of archival records and associated authority information, portal-like page composition, a collection assets navigator, an exhibition navigator, topic-based retrieval and navigation, and compatibility with relevant standards such as Spectrum, ISAD (G), EAD and Dublin Core.

- **OPERATIONAL PROGRAMME "COMPETITIVENESS"** (EPAN), Ministry of Development (www.antagonistikotita.gov.uk). We undertook the task to create a user friendly knowledge portal that will support the Program's Communication Management through the utilization of the internet, provide information on the program and legal documentation, inform public and media on the latest news of the program's actions and support the administration as well as the Info Desk.

- **COSMOTE**. In 2003 we undertook the challenge of redesigning the web portal of COSMOTE, Greece's leading mobile telecommunication company, which included the definition and execution of the project strategy, the requirements analysis and information design including the creation of a full scale information architecture, interface design and functional specification. The challenge initiative was how to use Internet technologies to integrate customers, investors, existing and prospective employees, and the media into one cohesive online communication infrastructure that could, at the same time, provide an experience tailored to the interests and needs of individual publics. The outcome, involving a cross-functional team from all departments of COSMOTE, was delivered through a wholly new interface design and information architecture that utilises a public-centric approach, providing state-of-the-art functionalities for media, investor, employee and customer relationship management.

University of Art and Design Helsinki (TaiK)

Partner Description

The University of Art and Design Helsinki (TaiK) gives education and pursues research in the fields of design, audio-visual communication, interactive media design and production, art education and the arts. TaiK is the largest art and design school in Scandinavia. Relevant for this project is the TaiK's experience involvement in developing digital content for the cultural heritage sector as well as the research and development projects carried out in the Media Lab faculty and the Media Centre LUME including considerable efforts in many IST projects in recent years.

The Media Lab is one of the 5 faculties of the university and has grown to become the leading department of its kind in Finland focusing on design and production for the New Media. In 2003 it was awarded the top educational unit award by the Finnish universities' evaluation council. The mission of the Media Lab is to explore, discover and comprehend the new digital technology and its impact in society; to find and exploit the possibilities it opens to communication, interaction, education and expression and to evaluate, understand and deal with the challenges it poses to design and creative production. The information society with its converging media is a complex environment that requires an interdisciplinary approach to design. This is reflected in the co-operative education and research projects of the Media Lab.

Key Staff

Dr. Prof. Lily Díaz-Kommonen (Senior Researcher)

Lily Díaz-Kommonen is professor of Systems of Representation and Digital Cultural Heritage at the Media Lab of the University of Art and Design Helsinki, Finland. Her research interests include digital design and its implementation in the cultural heritage sector; visualization and knowledge discovery; and Cultural Historical Activity Theory as a theoretical framework for art and design practices. She has been project leader and principal investigator. Among the concepts and tools she has developed are the Digital Facsimile of the Map of Mexico 1550, the Soft Ontology Layer (SOL) tool, and the ImageNotebook (ImaNote). She has received awards for her work in design including first prize in the Nabi Digital Storytelling Award organized by Art Center Nabi in Seoul, Korea in collaboration with UNESCO and the International Council of Museums, ICOM. Her dissertation, Art, Fact, and Artifact Production was published in 2002.

M.Sc. Lecturer, Markku Henrik Reunanen (Senior Researcher)

Markku Reunanen is a doctoral candidate at the Helsinki University of Technology and teaches Interactive Visualization at the Media Lab of the University of Art and Design Helsinki. His research interests include interface design and usability research. He has a Master of Science degree in software science from Tampere University and an MA in new media design from the Media Lab Helsinki. Reunanen has been involved in research and development of graphic user interfaces for virtual reality applications. His concept "Hello World! International Communication for Kids" received an Honorary mention in Digital Pluralism - UNESCO Digital Arts Award 2003. He is an early member of the Helsinki demo scene.

MA. Researcher, Mariana Salgado (Researcher)

Mariana Salgado is a researcher and doctoral candidate at the Media Lab Helsinki, University of Art and Design Helsinki. She has a Master of Arts degree in Product and Strategic Design from the same university. Her research interests are in user-centred methodologies in the context of public spaces of cultural organizations. She is familiar with media technologies design for public spaces. At the moment she is designing usability studies. She has been working in Media Lab for 3 years, participating in the following projects: 4G Design, Digital Facsimile of the Map of Mexico 1550, Äänijälki and ImaNote.

Publications

- (2005) Díaz-Kommonen, L., M. Nuikka, and H. Haggren, "A Voice for the Map of México: Chronicles, Legends and Oral Traditions from the Historic Center," Recording, Modeling and Visualization of Cultural Heritage, Proceedings of the International Workshop held in Asconna, Switzerland on May 22-27, Taylor Francis.
- (2005) Salgado, M. and A. Kellokoski, "Äänijälki, Opening Dialogues for Visually Impaired Inclusion in Museums," Proceedings of the International Workshop organized by Convivio: "Rethinking Technology for Museums: Towards a New understanding of the User", June 29-30, Limerick, Ireland, pp. 10-17.
- (2005) Reunanen, Markku, Palovuori, Karri, Ilmonen, Tommi, Mäkelä, Wille. Näprä - Affordable Fingertip Tracking with Ultrasound. Accepted to IPT & EGVE Workshop 2005.

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- (2003) Botero, A., Oilinki, I. and M. Salgado, "Digital tools for community building: Towards a community driven design". Participatory Design conference, Malmö, Sweden, pp. 215-219.

- (2002) Díaz-Kommonen, L. & M. Kaipainen, "Designing vector-based ontologies: Can technology empower open interpretation of culture heritage objects?" 13th Conference on Database and Expert Systems Applications, IEEE Computer Society, Los Alamitos.

Projects

- **POLKU** (2005–2006, a design research project). In the Finnish language polku is a term that indicates a small winding path in the woods. In this project polku is used to describe an interactive, distributed art work that makes use of a combination of mobile device technology, signage billboards, and 3D stereographic displays, to engage the viewer in a narrative. Located in public spaces and set against the background of emblematic institutions, such a system would allow for a walk through key historical moments where distant and contemporary, local as well as global, histories could be re-contextualized in an environment that allows for introspection and reflection. Our hypothesis is that such product could help alleviate the current state of semiotic imperialism, due to hegemonic corporate marketing communications, that exists many western cities and would allow cultural heritage institutions to display items in their collections in an ephemeral and cost-effective manner.

- **Map of Mexico** 1550 (1997-2006) The Digital Facsimile of the Map of Mexico 1550 is a digital replica of the original that is kept at the library of the University of Uppsala library in Uppsala, Sweden. The digitally born artifact created is a production of the University of Art and Design/UIAH, Media Lab and the Helsinki University of Technology, Department of Photogrammetry. The digital facsimile was shown as part of the massive exhibition AZTECS held at the Royal Academy of Arts in England from November 2002 to April 2003. AZTECS is considered to be one of the greatest

exhibitions of Aztec culture ever seen. During the years 2003-2004, the facsimile travelled with AZTECS to the Martin-Gropius-Bau in Berlin and to the Art and Exhibition Hall of the Federal Republic of Germany in Bonn. The project serves as a platform from which to develop and contextualize research and educational activities, as well as IT development in the area of Cultural Heritage. Current R&D activities include further refinement of the design specifications for ImaNote (Image Notebook) Tool.

- **CIPHER** (2002-2004, IST-2001-32559, Communities of Interest to Promote Heritage of European Regions, Research and development). The CIPHER project was set up in April 2002 as a 30-month project partly funded by the European Union. Members in the research consortium include the Open University, Knowledge. In Helsinki, the project worked on organization and navigation tools for the Web. The Soft Ontology Layer tool, which is based on the similarity-clustering paradigm was one of the outcomes of the project. Additionally, the project created Exploring Carta Marina, a cultural heritage Forum built around Nordic cultural heritage and the narratives of the Carta Marina of 1539. Most recently, CIPHER received a grant from the TULI programme to help disseminate its information about research findings and tools. TULI refers to the Tutkimuksesta liiketoimintaa [Research to Business] programme financed by Tekes, the National Technology Agency of Finland. During the autumn of 2005, we will be conducting a series of workshops to disseminate the use of the tools developed in the project to designers and personnel in the cultural heritage sector. http://cipher.uiah.fi

- **E-Culture Net** (2002-2003, IST-2001-3749, European Thematic Network). The project developed a European Digital Culture Research and Education Network. The consortium formed included 35 members from 17 countries. The project identified and defined research topics in digital culture; how teaching can focus those topics; how broadband pilots can generate new research topics among partners and built a foundation for a Distributed European Electronic Resource (DEER) for research in higher education. http://sysrep.uiah.fi/e_culture

- **Displaying Culture** (1999-2000, A study project about the discursive practices of exhibition spaces). The partners in the project were the University of Art and Design Helsinki, Media Lab, the University of Helsinki, Department of Anthropology, and the Helinä Rautavaara Museum in Espoo, Finland. The final outcome was a museum exhibition which used multimedia technology to provide guests with an immersive experience of the celebration of Easter in Carúpano, a small city in the north-eastern coast of Venezuela. The exhibition received glowing reviews from the national media and was invited to participate in the IV Festival of Nordic Museums in Stavanger, Norway.

Tools

- **Soft Ontology Layer** (SOL) Tool: The tool was developed as part of the work done in the CIPHER project. SOL makes use of Soft Ontologies - which are low-level, non-hierarchical and spatially defined descriptions - to allow the user to create a descriptive, interpretive layer of an artifact. The name relates to the fact that the resulting ontology is the product of properties entered using natural language and without the need of rigid, hierarchical grouping. Using SOL the ontology is described, analyzed, mapped to some numerical form and translated into a graphical representation. With a neural network algorithm, Self-Organizing map, SOL clusters the artifacts in an unsupervised fashion and generates a visual representation of the

clusters, providing a topological structure and placing similar artifacts in neighboring clusters. See: (http://cipher.uiah.fi/forum/tools?lang=en)

- **ImaNote** (Image and Map Annotation Notebook): ImaNote, is a web-based multi-user tool that allows you to transcribe (or record) information visually. With ImaNote a group of people can display an image (or a collection of high-resolution images) online and add annotations and links in to them. The current implementation works with Mozilla, Firefox and Communicator borwsers. The tool has been developed as part of the Map of Mexico 1550 project. See: (http://church.uiah.fi:9673/edam/)

Tel Aviv University, The Porter Institute for Poetics and Semiotics (TAU)

Partner Description

The Porter Institute for Poetics and Semiotics was founded in 1974 at Tel Aviv University. Houses Narratologists, Literary theorists; Cognitive linguists; Cultural study researchers; Semioticians. Emphasis of work: Literary theory; narratology, semiotics (sign theories); empirical studies of literature; semiotics of culture and post-structuralist cultural studies. Special experience: Research on intertextuality; research on canons and culture; work on relations between popular and 'high' culture; work on cognitive intertextuality and hypertexts. Institute's Publications: Poetics Today – an international journal in English (4 times a year), published and distributed by Duke University Press. Literature / Meaning / Culture – a books series in Hebrew dedicated on these topics.

Key Staff

Prof. Ziva Ben-Porat, Head of Institute (Senior Researcher)

Professor of poetics and comparative literature and expert in semiotics, intertextuality and cultural studies from a cognitive angle.

She specialises in comparative cultural semiotics, intertextuality as a structural and as a cognitive phenomenon, in particular intertextual relations: allusion, parody, imitation, rewriting, in relations between 'reality', representation and literary presentations)in as much as these relations effect the semantic attributes of cultural concepts, and in intertexts of Hebrew literature.

Prof. Meir Sternberg (Senior Researcher)

Prof. of Poetics and comparative Literature. A world renowned narratologist; awarded the Israel Prize for Comparative Literary Studies. Editor of Poetics today

Dr.Motti Benari (Senior Researcher)

Motti Benari, currently a researcher at Salzburg Research on Project [METOKIS] Methodology and Tools Infrastructure for the Creation of Knowledge Units. Holds a PhD in Hebrew Literature (cognitive Poetics) from Tel Aviv University. A fellow researcher in The Porter Institute of Poetics and Semiotics, TAU (Tel Aviv University). Was teaching for 6 years on the Hebrew Literature Department and for 3 years in the Theory of Literature Department. Was a Chief Researcher on CULTOS, responsible for the construction of the CULTOS' ontology. Current fields of interest are: Ontologies modeling, Technology

Enhanced Learning (E-learning), Figurative language, Cognitive linguistics, Technology and Cultural Heritage, Discourse, Visualization, Semiotics.

Publications

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- (1988) Autumn Poems and Literary Impressionism: Conceptualization, thematization, and classification, New Comparison 6 (158-175)
- (1990) "Autumn Songs as example of the relationship obtaining between lyrical poetry and popular songs," Proceedings of the 3rd congress of Semiotic Studies, Palermo 1984, M. Herzfeld (ed.). Berlin: De Greuyter.
- (1991) "Two Way Pragmatics: From world to text and back," Literary Pragmatics, R. Sell (ed.) 142-163. London: Routledge.
- (2001) "Sad Autumn and cultural Representations: a comparative study of Japanese and Israeli 'autumn'," The Psychology and Sociology of Literature, Dick Schram and Gerard Steen (eds), 243-260, Amsterdam/Philadelphia: John Benjamins.
- (2003) "Cultural Memory, Cultural History, and Cultural Canons in the Third Millennium" Arcadia 38:2 (339-342)
- (2004) guest editor of "Re-Writing" special issue of Journal of Romance Studies London.
- (2004-5) "Figurative Language Through Inter-Cultural Perspective" in collaboration with the Max Plank Institute, Leipzig, Germany. Led by Prof. Yeshayahu Shen (TAU) and Prof. David Gil (Leipzig).
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- Tsur, R. & Benari, M (2003) Means, Effects and Assumptions, in R. Tsur, On the Shore of Nothingness: a Study in Cognitive Poetics, Thorverton, Essex: Imprint, Academic press, 19-37.
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- Benari, M., (2005) "Similes in Poetry – How does it work?" Dapim Lemechkar Besifrut. (in Hebrew).

Projects

- **CULTOS** - Cultural Units of Learning, Tools and Services: 2001-2003; focus: knowledge-aware multimedia authoring and presentation tools; TAU tasks: ontological modelling of inter-textual relationships, cultural case studies; TAU senior researchers: Prof. Z. ben Porat, Dr M. Benari; www.cultos.org
- **METOKIS** – Methodology and Tools Infrastructure for the Creation of Knowledge Units: 2004- 2005; carrier architecture for task-related knowledge-content objects; http://metokis.salzburgresearch.at Note: in METOKIS, TAU involvement is through participation Dr Motti Benari who is currently (temporary) employed by Salzburg Research to carry out ontological analysis and case studies.

Helsinki University of Technology (TKK), Semantic Computing Research Group (SeCo)

Partner Description

The Semantic Computing Research Group (SeCo) (http://www.cs.helsinki.fi/group/seco/) is the first and largest research group in Finland focusing on research on ontologies and the Semantic Web. SeCo conducts research projects at the Helsinki University of Technology (TKK), Media Technology, and at the University of Helsinki (UH), department of computer science. TKK, established in 1849, (http://www.hut.fi) is the largest technical university in Finland with 12 faculties, 250 professors and 15,000 students. University of Helsinki is (http://www.helsinki.fi/university/) the largest and oldest university (1640) in Finland with 11 faculties and 38,000 students.

SeCo group is internationally known from its work on bringing cultural contents on the Semantic Web. In 2004, MuseumFinland (http://www.museosuomi.fi), a semantic portal created by SeCo, got the international Semantic Web Challenge Award (at ISWC-2005, Japan), was a finalist in the Nordic Digital Excellence in Museums competition (Nodem-2004), and got the Prime Minister's Innovation Price as the most innovative web application in the Quality on the Web competition in Finland

SeCo is directing the national Finnish ontology project FinnONTO in 2003-2007. The goals of this project include creation of large national cultural ontologies and metadata conforming to them based on museum collections, cultural databases, and other sources of cultural heritage information. This content will be available on the web in a new semantic portal that is being developed based on MuseumFinland. FinnONTO is financed by the National technology agency Tekes and 26 companies and public organizations (volume 0.8M€/ year), and the research involves three major Finnish universities. Most of the research is done by SeCo.

Key Staff

Prof. Eero Hyvönen (Senior Researcher)

Eero Hyvönen (http://www.cs.helsinki.fi/eero.hyvonen/) (born 1957) is professor of semantic media technology at TKK and docent of computer science at the University of Helsinki, Dept. of Computer Science. He directs the Semantic Computing Research Group SeCo at these universities. Eero Hyvönen's research interests are semantic web technologies and artificial intelligence. In these fields, he has published over 200 books and articles, has won several technology awards, has been member of board in various scientific and technological organizations, and is member of the editorial board of the International Journal of Metadata, Semantic, and Ontologies. Eero Hyvönen has also interest in industrial applications, and has been a software entrepreneur.

Markus Holi, Researcher

Markus Holi holds MSc both in computer science and in psychology. His research has focused on representing ontological uncertainty, RDF-based logic programming, eHealth ontologies, and ontology mapping.

Tomi Kauppinen, Researcher

Tomi Kauppinen holds MSc in computer science. He is a PhD student doing research on ontologies and knowledge representation of geo-spatial change in historical data. Tomi Kauppinen is teaching semantic web technologies at TKK.

Eetu Mäkelä, Researcher

Eetu Mäkelä has been a member of SeCo since 2003, and has large experience in web technologies, Semantic Web, and computer science. In addition to research, he is teaching semantic web service technologies at TKK. Eetu Mäkelä contributed significantly to the design and implementation of OntoViews and MuseumFinland.

Kim Viljanen, Researcher

Kim Viljanen has been a member of SeCo since 2002. He's research interests include, e.g., semantic web technologies, recommending systems, and semantic service modeling. Kim Viljanen has been influential in the design of many eCulture systems developed by SeCo, such as the semantic photograph retrieval system Promoottori and MuseumFinland

Publications

Recent publications 2002-.

- Hyvönen, E. (ed.) Semantic Web Kick-Off in Finland - Vision, Technologies, Research, and Application. HIIT Publications, 2002-001, Helsinki Institute for Information Technology, Helsinki, Finland, 2002.

- Hyvönen, E. and Klemettinen M. (ed.) Towards the Semantic Web and Web Services. HIIT Publications, 2002-003, Helsinki Institute for Information Technology, Helsinki, Finland, 2002.

- Hyvönen E.. Semantic Web - The new Internet of meanings. In: Semantic Web Kick-Off in Finland - Vision, Technologies, Research, and Applications, HIIT Publications, 2002-001, Helsinki Institute for Information Technology (HIIT), Helsinki, Finland, 2002.

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- Hyvönen E., Viljanen K., A. Hätinen: Yellow Pages on the Semantic Web. In: Towards the semantic web and web services, Proceedings of XML Finland 2002 Conference. pp. 3-14.

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- Hyvönen E., Junnila M., Kettula S., Saarela S., Salminen M., Syreeni A., Valo A., Viljanen K.: Publishing Collections in the "Finnish Museums on the Semantic Web" Portal—First Results. Paper presented at the symposium Arts and Humanities in the Digital Domain: Towards Web based Culture and Science, Salzburg, Austria, Oct. 6-7, 2003. Proceedings of XML Finland 2003, Oct. 30-31, 2003, Kuopio, Finland.

- Hyvönen E., Valo A., Viljanen K., Holi M.: Publishing Semantic Web Content as Semantically Linked HTML Pages. Proceedings of XML Finland 2003, 30-31.10.2003, Kuopio, Finland.

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Projects

- **Intelligent semantic web directories** - Developed semantic search and browsing technologies and applications. Focus on eCulture applications. Created the MuseumFinland concept and implementation. 2002-2004.

- **AdaNets** – Semantic service modelling and finding technology with mobile phones. Part of a Eureka-project, joint work with Nokia Corp. 2003.

- **Intelligent web services** – Research on service modeling, semantic yellow pages, ontologies for eHealth services, semantic eGovernment portals. Created various demonstrational applications and OntoViews tool. 2003-2005.

- **National Ontology Project in Finland** (FinnONTO).Developing large ontologise, collaborative ontology engineering, ontology servers, semantic portals in eCulture, eHealth, eGovernment, eLearning, semantic meta-search engines, etc. Large national project where semantic eCulture is an important application domain. 2003-2007.

Tools

- **OntoViews** – a tool for contructing semantic portals.
- **Terminator** – term extraction tool used in MuseumFinland.
- **Annomobile** – a semiautomatic content annotation tool used in MuseumFinland.
- Various scripting tools for converting thesauri into ontologies.

Intersoft s.a

Partner Description

InterSoft, a. s. is a Slovak-Finnish company operating in the information technologies area, registered in Slovakia as a joint stock company. It was established in 2001 as a spin-off of the EU funded Esprit Project 29065 "Web in Support of Knowledge Management in Company (KnowWeb)".

The company offers services in the field of analysis and development of the software in the area knowledge management, knowledge technologies, knowledge modelling, information retrieval applications, agent technologies, web technologies, data and text mining, e-government applications, point of sale solutions etc. The members of our development teams possess extensive knowledge and professional experience with various platforms (MS Windows, UNIX, Linux, Novell Netware), software develpoment environments (C/C++/C#, Java, J++/J#, Visual Basic, Pascal/Delphi, Perl, Lotus Script, VB Script), Java technologies (Java Servlets, Tomcat, Java Applets, JSP, Java Beans, Java Enterprise Beans, JDBC, JDO, Turbine, Velocity, Castor, Lucene, Struts, Hibernate, Torque, Xerces), database systems (SQL, 4GL, Oracle, Informix, MS SQL Server, Sybase, DB2, Sybase SQL Anywhere, InterBase, MS Access, Btrieve, MySQL, PostgreSQL, ODBC, JDBC, FoxPro), internet technologies (HTML/XHTML, XML/XSL, Java Script, CGI, ASP, PHP), networking and distributed programming (TCP/IP, socket interface, client-server, RPC, RMI, COM/DCOM/COM+, CORBA, Web Service, mobile agents, network security).

Staff members have participated in several international EU funded R&D projects, e.g. in the area of knowledge management - Esprit 29065 "Web in Support of Knowledge Management in Company (KnowWeb)", Esprit 29015 "Enriching Representations of Work to Support Organisational Learning (ENRICH)", and in the area of e-government and e-democracy - IST-1999-20364 "Web Technologies Supporting Direct Participation in Democratic Processes (Webocracy)". InterSoft, a. s. is cooperating with and delivering software solutions for companies in Europe (Finland, Germany) and USA.

Key Staff

Karol Furdik

Karol Furdik, MSc, PhD graduated in Technical Cybernetics at the Faculty of Electrical Engineering and Informatics of the Technical University of Kosice in 1993 and PhD in natural language processing and knowledge modelling (2005). Working for several IT companies in Slovakia (Gratex International, IFBL Slovakia, Juvier, InterSoft, a. s.) as an analyst, programmer and development team leader. Participated in several EU funded R&D projects (Esprit 29065 KnowWeb, IST-1999-20364 Webocracy). Extensive IT and SW development skills (operation systems, programming languages, development of applications etc.), research in the area knowledge management, information retrieval, e-business, natural language processing.

Projects

Staff members have participated in several international EU funded R&D projects:

- **Web in Support of Knowledge Management in Company** (KnowWeb) - Esprit project funded in the EU FP4 Program. Two important perspectives are considered in the project: business perspective (Why, where, and to what extent the organisation should invest in or exploit knowledge. Which strategies, products and services, alliances, acquisitions, should be considered from knowledge-related points of view.) and management perspective (Determining, organising, directing, and monitoring knowledge-related activities required to achieve the desired business strategies and objectives.) The market for KnowWeb Toolkit consists of all knowledge-intensive organisations who are aware of advanced IT technologies, preferably following the trends of globalisation in their business area. For the purposes of exploitation preference is given to early adopters and innovators.

- **Enriching Representations of Work to Support Organisational Learning** (ENRICH) - Esprit project funded in the EU FP4 Program. The Enrich Project aimed to develop tools and methodologies for integrating working and learning within knowledge intensive organisations. It built upon existing technologies supporting web based collaboration, agents and knowledge modelling. The ENRICH project fostered the use of knowledge-enriched intranets to provide the means for sharing expertise.

- **Web Technologies Supporting Direct Participation in Democratic Processes** (Webocracy) – IST project in the EU FP5 Program. The project responds to an urgent need to establish efficient systems providing effective and secure user-friendly tools, working methods, and support mechanisms to ensure the efficient exchange of information between citizens and administrations. The project addresses the problem of providing new types of communication flows and services from public institutions to citizens, and improves the access of citizens to public administration services and information. The new types of services will increase the efficiency, transparency and accountability of public administration institutions and their policies toward citizens.

- **Access to e-Government Services Employing Semantic Technologies** (Access-eGov) – IST project funded in the EU FP6 Program. By employing semantic technologies the Access-eGov project will support semantic interoperability among e-government services across organisational, regional and linguistic borders. For service providers (on all levels of public administration - local, regional, national, and European) Access-eGov will enable introduction of a (new) e-service to the world of e-government interoperability in an easy way. The government service registered in the Access-eGov may be localized, contracted and used automatically through agents and other IT components. For citizens and business users the Access-eGov will provide two basic categories of services.

Tools

- **KnowIT!** is software package applying knowledge management and knowledge technologies especially for small and medium enterprises. This system is used to support decision processes, to manage and archive multimedia documents, extraction of implicit knowledge from the heterogeneous information sources (data mining) and intelligent data search considering contextual dependences. There are several artificial intelligence techniques used, for example conceptual representations, heuristics, planning and scheduling algorithms, partially neural networks, and mechanisms of native language processing.

- **Webocract** is complex information system for e-Government and e-Democracy and provides complex solutions to increase efficiency and transparency of the communication process between citizens and institutions. The Webocrat presents scalable and customisable web-based information system with accent to easy maintenance and navigation, efficient and intelligent search (using knowledge technologies), many interactive elements to increase participation of citizens in the democracy process of the public administration. Modularity of the offered system allows configuration of the actual organization's needs. Specific administration interface using knowledge technologies and conceptual organization model allows independently maintain, change and customize the content of published information. Citizens are allowed to have transparent overview of activities and authority of the organization, fast and flexible navigation in the amount of offered information.

- **e-Filling Room** is web-based e-Government application for enhancement of communication processes between citizens and local authority. For citizens, it provides customisable and easy-to-use web interface for navigation and submitting various forms to the proper office of the local authority, without the need to understand the complicated structure of offices and their interdependence. It is achieved by knowledge management techniques implemented as a core facility of the application. Other advantages of this solution are flexibility and easy customisation of forms and navigation links from the side of the local authority, which can be made by web-based user interface for administrators. The e-Filing Room can be easily integrated into an already existing IS of the local authority office by XML-based programming interfaces.

- **FoundIS** is a web-based tool integrating functionality and features of a content management system and general information system. The system is especially dedicated for non-profit organizations (foundations, grant agencies, interest groups) as well as for private profit-making companies. The FoundIS consists of two, relatively independent, modules: web publishing web system (management of structure and content of the site for publishing various multimedia information of static or dynamic nature) and information system (tools for management of information and documents for your communication and cooperation with customers and partners, e.g. management of projects, programs, contacts, finance, etc.).

- **Helptrix** is a help authoring system for creating professional help and manuals in several formats from a single source. Helptrix provides a tool for translating help or manuals to additional languages and maintaining multi-language help systems. With Helptrix the user only focuses on the writing content. User can set the formatting rules and appearance anytime during the work

The Interactive Institute AB (TII) – V4M Sweden

Partner Description

The Interactive Institute is an experimental IT-research institute which creates results through combining art, design and technology. The institute consists of 10 different research groups, distributed around Sweden. One of them is Visions for Museums V4M set up in 1999, http://www.tii.se/v4m.

The Interactive Institute through its V4M research group explores the ways in which digital technologies can develop and enhance on-site and online visitor interaction within museums of art, culture, history and science, as well as at heritage sites (e.g. archaeological) and

attractions (e.g. theme parks). V4M:s aims at being a centre of interdisciplinary research and practice regarding visitor-oriented ICT and new media.

Key Staff

Halina Gottlieb, Director

Halina Gottlieb has a B.A in History of Art and has managed the Visions for Museums studio at the Interactive Institute since its creation in 1999 and has extensive experience in handling and operating within the museum sphere. She is the founder and chairman of NODEM, thus having contacts and knowledge within the area concerning Visitor Study Lab. Previously being the CEO of Shortcut Edutainment Projects in Stockholm and board member of Guldkanten AB. She was also the Swedish representative in the EU network of excellence in E-Culture. Halina Gottlieb is coordinating and managing the Visitor Study Lab at Interactive Institute in Sweden.

Helen Simonsson (researcher)

Helen Simonsson has a Master of Fine Arts (MFA) in Three-dimensional Design; Bachelor of Arts (BA) with a Major in Classical Archaeology and Ancient History. Helen has also 1 ½ years of studies of "cultural heritage knowledge" at the Stockholm University. She has been working in different museums in Stockholm for 20 years, mainly with conservation and education. Furthermore, she has also been teaching both children and adults about practical art and creativity. Helen is very interested in finding new ways of making museums more aware of their visitors' expectations and making them more user-friendly. Helen is currently working as project manager at V4M secretariat, and Nodems secretariat and researcher of visitor studies.

Eva Insulander (educator)

Eva Insulander has a Masters in archaeology from the University of Stockholm. Eva has been a teaching assistant at the Stockholm Institute of Education, including participation in postgraduate courses. She has many years of experience in various teaching environments, such as schools and museums and is interested in researching learning in museums, especially cultural history museums. Eva is currently Museum educator at Historiska museet, Stockholm.

Publications

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- H. Gottlieb, E.Insulander, H.Simonsson - Access in Mind - Enhancing the Relationship to Contemporary Art, ICHIM, Berlin 2004
- H.Gottlieb, H.Simonsson, H.Öjmyr- Virtual Touch of a Sculpture, EVA, London 2005
- H. Gottlieb, H. Simonsson, S. Lindberg, L. Asplund- Audio guides in disguise – Introducing natural science for girls, Re-thinking technology for museums, Limerick, 2005
- H. Gottlieb, H. Simonsson- Formative evaluation of Access in Mind – Measuring Behaviour 05/Wagningen

Projects

V4M has the following lines of activities that circle around the interaction of users with IT-enhanced CH exhibitions, some of them involving the use of mobile/handheld devices:

- Installations in museums: For example, **'Historiehuset"** - Conceptual development of an interactive imaging installation at Jamtli, the cultural historical museum of the county of Jämtland; 'Unga ingångar' (Young Entries): Collaboration and exhibit project with Liljevalchs Art Gallery, Stockholm and the university of Stockholm, regarding young people, digital media and interpretation of contemporary art.

- Interaction with exhibits via mobile/handheld devices: For example, **Mölndal** digital guide: evaluation and visitor study of users interacting with handheld, wireless multimedia guides at the museum of Mölndal, Sweden.

- **Special research & development** on "Digital media in the hands of visitors": Research project on the physical, cognitive and affective outcomes of digital media interpretation in museums and galleries. In collaboration with The Stockholm Institute of Education.

- **NODEM** - Nordic Digital Excellence in Museums (organised by V4M): The annual Nordic forum and award for digital museum installations and interactives. NODEM was initiated by V4M in 2003, in collaboration with the Nordic museums associations and with financial support by the Nordic Cultural Fund and the Nordic Council of Ministers (www.tii.se/v4m/nodem). NODEM has been held at Dunkers Kulturhus, Helsingborg, Sweden 2003 and at Kiasma, Museum of Contemprary Art, Helsinki, Finland 2004.

- **Special training courses**: "New Media, visitors and exhibitions"; a four week study course at the University College of Film, Radio, Television and Theatre, Stockholm, Sweden.

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ISO/IEC. Text of ISO/IEC 15938-5/FDIS Information Technology - Multimedia Content Description Interface - Part 5: Multimedia Description Schemes. ISO/IEC JTC 1/SC 29/WG 11/N4242, Singapore, September 2001.

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Annex 3: Information on EMMA pilots – and Letters of Support

Pilot 1: MuseumFinland (Semantic Portal) - Helsinki University of Technology (TKK) / Semantic Computing Research Group (Finland)

Pilot context / environment:

The semantic cultural heritage portal MuseumFinland has been developed in the years 2002-2004 by the EMMA partner Helsinki University of Technology's Semantic Computing Research Group, under the direction of Prof. Eero Hyvönen.

In 2004, MuseumFinland was awarded the international Semantic Web Challenge Award (at ISWC-2005, Japan). It also received the the Prime Minister's Innovation Price as the most innovative web application in the Quality on the Web competition in Finland.

Currently, a new version of the semantic portal is being developed in the framework of the FinnONTO project (2003-2007), which is directed by Prof. Eero Hyvönen. This new version will build on the established MuseumFinland, and have new features and provide access to additional content from FinnONTO partners.

Pilot specifications:

The pilot specification will be developed in EMMA WP6:

T6.1: Access to post-war cultural history collections,

T6.2: System installation and lead user management for user sites.

The pilot will mainly serve technical purposes it is currently not intended to publish content from FinnONTO partners. However, if presenting content on the Web is consider conditions will be negotiated by the content owners after selecting the needed contents. Generally, FinnONTO project is based on Open Source licensing and the idea of open content publishing on the Web.

Pilot leader:

Pilot leader is EMMA partner Helsinki University of Technology / Semantic Computing Research Group.

Pilot 2: "The Memory of the Netherlands" - Koninklijke Bibliotheek – National Library of the Netherlands

Pilot context / environment:

This pilot will be run at the Koninklijke Bibliotheek – National Library of the Netherlands.

The Library leads the initiative Het Geheugen van Nederland (The Memory of the Netherlands), that brings together rich digital collections of several Dutch cultural heritage institutions.

The "Memory" is hosted by the Library, and includes digital collections such as (to provide but three examples):

- *150 years of advertising in the Netherlands* (1850-2002), from the ReclameArsenaal (Amsterdam) over 12,000 advertising items.
- *Algemeen Hollands Fotopersbureau, 1945-1969",* from the International Institute for Social History in Amsterdam (1900 photographs that show the changes in the Netherlands in the 1950s and 1960s)
- *Memory in Motion* (The modernisation of the Netherlands after World War Two), from the Netherlands Institute for Sound and Vision.

Further details (in English) are to found at: www.geheugenvannederland.nl

Pilot specifications:

The pilot specification will be developed in EMMA WP6:

T6.1: Access to post-war cultural history collections,

T6.2: System installation and lead user management for user sites.

Pilot leader:

Pilot leader is EMMA partner Centrum voor Wiskunde en Informatica (CWI); technical CWI researchers will carry out the installation of server components and clients.

The Library has declared that "we will put every effort into realising that the project will be able to access metadata and content of relevant digital collections of 'The Memory of the Netherlands' to perform technology testing and demonstration tasks."

Declaration:

See attached Letter of Support from the Koninklijke Bibliotheek, September 19, 2005.

KB

Koninklijke Bibliotheek

| date | our number | your letter | telephone |

subject

The Hague, September 19, 2005

To whom it may concern

Letter of Support

This is to declare that the Koninklijke Bibliotheek - National library of the Netherlands is interested and willing to collaborate with the proposed project European Meme and Memory Agent (EMMA).

The Koninklijke Bibliotheek makes accessible to the public digital collections such as the ones brought together under the title "The Memory of the Netherlands".

We understand that this major source is of particular interest to the EMMA project as it contains several large special collections of post-war cultural history material.

We are particularly interested to collaborate with the EMMA project as the methods and technologies it will develop complement our efforts to achieve a high degree of interoperability of heritage services and resources as well as their broad use by the public.

Therefore, we will put every effort into realising that the project will be able to access metadata and content of relevant digital collections of "The Memory of the Netherlands" to perform technology testing and demonstration tasks.

We also expect to learn in this collaboration about novel approaches of semantic contextualisation and access to digital collections.

Sincerely,

dr. M.P. Bossenbroek,
Director of Collections & Services

Pilot 3: Exhibition environment – Stockholm City Museum (Sweden)

Pilot context / environment:

The pilot will be organised in the framework of a larger exhibition of the Museum. According to the focus of the Museum, such an exhibition will cover with various topics such as living conditions, social and cultural places, transport, architecture, as documented in historical images and records as well as contemporary descriptions and interpretations (e.g. photo commissions or video documentaries).

The Museum strives to involve and engage visitors in new ways. Hence, a major goal is to capture and make explicit how the citizens themselves see their city, what it means for them to live here, places, artefacts, traditions they cherish.

This will be an excellent environment for exploring the usefulness and usability of EMMA tools such as the User Agent. The Museum will provide the required environment and invite visitors to contribute their stories and images related to representations of exhibition objects on the museum's website. Also a smaller but inspiring thematic collection of digitised photographs may be used as starting point.

Pilot specifications:

The pilot will be organised according to the specifications in EMMA work package 5: T5.4: User testing & validation plan. The plan will specify goals, required settings and contexts, methods, metrics, schedules, and templates for reporting the results.

Pilot leader:

The overall concept for the pilot will be developed by EMMA partner Interactive Institute/Visions for Museums, taking into account the general pilot specifications.

Pilot leader is Ms Halina Gottlieb B.A. - Director of V4M.

Between V4M and the Stockholm City Museum already exists a close working relationship.

Declaration:

See attached letter by the Stockholm City Museum, September 16, 2005.

15. SEP. 2005 13:27   STADSMUSEIFORVALTN   NR. 217   S. 1

Stadsmuseiförvaltningen
STOCKHOLMS STADSMUSEUM

Stockholm, September 16, 2005

To whom it may concern

LETTER OF SUPPORT

This is to declare that the Stockholm City Museum is interested and willing to collaborate with the proposed project European Meme and Memory Agent (EMMA).
The Museum runs a program of exhibition and visitor involvement activities that can provide a very suitable environment for using tools that will be developed in EMMA.
A future exhibition of particular interest may be "Living in a large City" (working title), which is currently in its first development phase. Here the idea is to engage younger visitors to learn and discuss about cultural and social changes in the city.
We understand that the tools will enable visitors (also to our website) to tell their stories related to museum exhibits as well as images of personal objects or situations that they can contribute to the exhibition.
We are strongly interested in such novel forms of visitor participation, online exhibitions and narratives, which may also inspire teachers and students to use museum resources for cultural projects.
The Museum will collaborate with the EMMA project partner Interactive Institute, with whom we have an established close working relationship.

Sincerely,

Hans Öjmyr, Ph D
Head of Department, Exhibition and Education
hans.ojmyr@stadsmuseum.stockholm.se
08-508 31 631
070-46 31 631

BOX 150 25, 104 65 STOCKHOLM, BESÖKSADRESS: RYSSGÅRDEN, SLUSSEN

Pilot 4: Study course environment – New Media Laboratory / Panteion University (Greece)

Pilot context / environment:

The Department of Communication, Media and Culture of the Panteion University has a New Media Laboratory that since 1999 carries out teaching and research activities. The Laboratory will organise a user pilot, in which students of cultural digital communications experiment with EMMA tools in the framework of a semester-long practicum or course. Participants will be second or third year students supervised by researchers of the Laboratory.

Pilot specifications:

The pilot will be organised according to the specifications in EMMA work package 5: T5.4: User testing & validation plan. The plan will specify goals, required settings and contexts, methods, metrics, schedules, and templates for reporting the results.

It is intended to use participant observation methods to capture how the students' use the tools in practice. In order to provide qualitative feedback for interface and interaction improvements, the pilot should allow for a good understanding of how the tools are framed and understood by the users themselves.

Pilot leader:

The user pilot will be lead by the Director of the Laboratory, Ass. Prof. Y. Skarpelos.

Prof. Skarpelos teaches Visual Culture and Visual Sociology at the Department of Communication, Media and Culture at Panteion University, He is also supervisor of the thematic unit "Social Aspects of Cultural Phenomena" at the "Cultural Management" graduate course of the Hellenic Open University.

Prof. Skapelos research focus is cultural analysis. He is a member of the *International Visual Sociology Association*, member of the editorial board of the journals *Visual Studies* (Routledge) and *Visual Communication Quarterly* (Lawrence Erlbaum Associates). He is the author of *Terra Virtualis: The Construction of Cyberspace* (1999), *Historical Memory and Greekness in Comics* (2000), *Image and Society* (forthcoming, early 2006), and several papers in journals and edited volumes.

<u>Declaration:</u>

See attached letter by Prof. Y. Skarpelos, Athens, September 19, 2005.

To: Mr John Pereira
Salzburg Research

Athens, 19 September 2005

Dear Mr Pereira

RE: Participation in the EMMA (European Memory and Meme Agent)
project

The New Media Laboratory of the Department of Communication,
Media and Culture of Panteion University is pleased to confirm its
support and participation in the EMMA project, which is currently
submitted for funding to the IST programme.

Being part of the Department of Communication, Media and Culture's
Media Lab, the New Media Lab started its teaching and research
activities back in 1999. Since then, has been intensely involved in
educating the students in new technologies, from scratch to HTML and
Network Architecture, as well as in supporting the Department's
research. In the same time, the New Media Lab has participated in
research projects in collaboration with major Greek and international
research organizations and Universities.

I hereby confirm that the New Media Lab will organize and host a trial
experiment using the tools to be developed by the EMMA project,
integrating this experiment a semester-long practicum/course on
cultural digital communication addressed to second or third year
students. The trial will be conducted by researchers attached to the
Laboratory under my direction and will involve participant observation
methods, and will focus on understanding and evaluating the user
experience of subjects with collecting, tagging and accessing artifact-
related information and assets, latent meaning structures (memes) and
multimedia sequences (stories, narratives) served by EMMA tools. We
will also be involved in other tasks related to understanding the user
experience for digital cultural communications following the EMMA
approach, as required by the project workplan.

Yours faithfully,

Ass. Prof. Y. Skarpelos
Director, New Media Laboratory

Τμήμα
Επικοινωνίας
και Μέσων
Μαζικής
Ενημέρωσης

Λεωφόρος Συγγρού 136
176 71 Αθήνα
Telefax 9223690
Telex   22 4296

Annex 4: Consortium Letters of Intent

CWI   Centrum voor Wiskunde en Informatica

Your reference	
Date	
Our reference	M6340
Date	15-08-2005
Telephone	+31 20 592 4033
E-mail	F.A.Roos@cwi.nl

John Pereira
Salzburg Research
Forschungsgesellschaft mbH

Jakob-Haringer-Straße 5/III
A-5020 Salzburg / Austria

Subject: **Letter of Intent – EU FP6-IST Project EMMA**

The Centrum voor Wiskunde en Informatica (CWI) herewith confirms that it intends to participate in an EU FP6-IST project under the title "European Meme and Memory Agent (EMMA)" if the contract is granted to the project consortium. The proposal will be submitted in response to call FP6-2005-IST-5.

We authorize the coordinator to submit the proposal also on behalf of CWI.

Yours sincerely,

Mr. D.G.C. Broekhuis
Financial Director CWI

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Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III, A-5020 Salzburg
tel. +43-662-2288-301; fax: +43-662-2288-222
fbi@salzburgresearch.at
http://www.salzburgresearch.at

Letter of Intent

between

Salzburg Research Forschungsgesellschaft m.b.H.

Jakob-Haringer-Straße 5/III A-5020, Salzburg, Austria

and

Consiglio Nazionale delle Ricerche, ISTC-CNR

P.le Aldo Moro 5, Roma, Italy
to participate in the proposal
European Meme and Memory Agent (EMMA)

Preamble
The Parties intend to submit a proposal related to the programme call **IST call 5 FP6-2005-IST-5 Strategic objective: 2.5.10 - Access to and preservation of cultural and scientific resources, focus: Access to CH resources, instrument: Specific targeted research project STREP,** with **Submission deadline: 21. September 2005, 17:00 CET,** and to implement the project in case of an acceptance by the European Commission.

State of negotiations: All arrangements that are reached within this letter of intent shall be replaced by the provisions of the consortium agreement. **Confidentiality:** The Parties commit themselves to treat all information, documents, evaluations, drafts, outlines or technical specifications etc., they have received indirectly or directly in the context of the negotiations about the project as well those of technical, financial or other business nature, strictly confidential and will not in any form forward it to third Parties. **Termination of negotiations:** This letter of intent does not establish an obligation for any of the Parties to sign the intended consortium agreement. The Parties, however, agree that on the basis of the previous negotiation results and the previous good constructive talks a failure of the negotiations shall only be possible if a confident cooperation can not be ensured any longer. **Costs:** Each Party bears its own costs accumulated so far in connection with this letter of intent. In particular, these include expenses for travelling, lawyers, investigations, consulting, planning etc.

Director, Institute for Cognitive Sciences and Technology, Italian National Research Council (ISTC-CNR)

Roma, August 31st, 2005

Letter of Intent to participate in the proposal European Meme and Memory Agent (EMMA)

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Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III, A-5020 Salzburg
tel. +43-662-2288-301; fax: +43-662-2288-222
fbi@salzburgresearch.at
http://www.salzburgresearch.at

Letter of Intent
between
Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III A-5020, Salzburg, Austria
and
Knowledge Media Institute
The Open University
Walton Hall, Milton Keynes, MK7 6AA, UK

to participate in the proposal
European Meme and Memory Agent (EMMA)

Preamble
The Parties intend to submit a proposal related to the programme call IST call
5 FP6-2005-IST-5 Strategic objective: 2.5.10 - Access to and preservation of
cultural and scientific resources, focus: Access to CH resources, instrument:
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these include expenses for travelling, lawyers, investigations, consulting,
planning etc.

(signature)

Prof. Enrico Motta, Director of KMI
Milton Keynes, 31/8/2005

Letter of Intent to participate in the proposal European Meme and Memory Agent (EMMA)

CTIT
Centre for Telematics and
Information Technology

P.O. Box 217
7500 AE Enschede
The Netherlands
Phone: +31 53 489 8031
Fax: +31 53 489 1070
E-mail: office@ctit.utwente.nl

To: John Pereira
        Salzburg Research Forschungsgesellschaft mbH
        Jakob-Haringerstrasse 5/III
        A-5020 Salzburg
        AUSTRIA

Date: August 15, 2005   Our ref: CTIT/05/119/Tnk

Subject: Letter of intent for the project: EMMA: European Meme and Memory Agent.

Letter of Intent

Hereby we declare our interest and intention to participate in the proposal for the project entitled *"European Meme and Memory Agent"* (Acronym: **EMMA**), coordinated by the Salzburg Research Forschungsgesellschaft mbH, Austria. The proposal is to be submitted to the FP6-2005-IST-5 strategic objective "Access to and preservation of cultural and scientific resources".

Date: August 15, 2005

Organisation name: University of Twente / CTIT

Name of signatory: Drs. I. Bante

Position: Business director CTIT

Signature:

Stamp:

University of Twente
The Netherlands

PRC GROUP

the management
house

John Pereira
Research Manager, eCulture Group
Salzburg Research Forschungsgesellschaft mbH
Jakob-Haringer-Straße 5/III
A-5020 Salzburg / Austria

10 September 2005

Dr Costis Dallas

Vice Chairman
Head of Innovation

Dear John,

Thank you for your invitation to participate in the European Meme and Memory Agent project consortium, which is to submit a proposal to the 5th Call of the IST programme (FP6).

I would like hereby to confirm that PRC Group – The Management House SA wishes to participate in the consortium, on the basis of the documents you sent me so far, and on the basis of our current discussions regarding the contribution of PRC Group to the project.

I am looking forward to working with you on this exciting proposal and project.

With kind regards,

Costis

PRC Group S.A.
Innovation Business Unit
80 Louizis Riancourt st.
115 24 Athens

Phone: +30 212 9559300
Fax: +30 212 9595323
E-mail: cdallas@prc.gr

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Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III, A-5020 Salzburg
tel. +43-662-2288-301; fax: +43-662-2288-222
fbi@salzburgresearch.at
http://www.salzburgresearch.at

Letter of Intent
between
Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III A-5020, Salzburg, Austria
and
TAIDETEOLLINEN KORKEAKOULU/MediaLab (University of Art and Design Helsinki)
Hämeentie 135 C, 00560 Helsinki, Finland
to participate in the proposal
European Meme and Memory Agent (EMMA)

Taideteollinen korkeakoulu/MediaLab (University of Art and Design Helsinki) herewith confirms that it intends to participate in an EU-FP6-IST project under the title "European Meme and Memory Agent (EMMA)" if the contract is granted to the project consortium. The proposal will be submitted in response to the call FP6-2005-IST-5. We authorize the coordinator to submit the proposal on behalf of TAIDETEOLLINEN KORKEAKOULU/MediaLab.

Preamble
The Parties intend to submit a proposal related to the programme call **IST call 5 FP6-2005-IST-5 Strategic objective: 2.5.10 - Access to and preservation of cultural and scientific resources, focus: Access to CH resources, instrument: Specific targeted research project STREP**, with **Submission deadline: 21. September 2005, 17:00 CET**, and to implement the project in case of an acceptance by the European Commission.

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(signature)   *PHILIP DEAN*

Director   Media Lab faculty
(name and function)

Helsinki   18th August 2005
(Place, Date)

Letter of Intent to participate in the proposal European Meme and Memory Agent (EMMA)

TEL AVIV UNIVERSITY

THE LESTER AND SALLY ENTIN
FACULTY OF HUMANITIES

THE PORTER INSTITUTE FOR POETICS AND SEMIOTICS

אוניברסיטת תל-אביב

הפקולטה למדעי הרוח
ע״ש לסטר וסאלי אנטין

המכון הישראלי לפואטיקה וסמיוטיקה ע״ש פורטר

Mr. John Pereira, Coordinator,
EMMA
Salzburg Research

Aug. 16, 2005

Letter of interest

Dear John,

Following my email I hereby formally announce my interest in EMMA, both in my name and for the Institute. I am delighted to be part of this promising project.

I believe you have all the necessary information concerning TAU and The Porter Institute since CULTOS.

However, since I'm going to be away from the 27th and thru Sept., and may be slow in responding to email requests, I'd like to provide you with the name and address of a contact in TAU's Research Authority. Please address every request (or question concerning the A2 form) both to me and to

Keren Tabach   kerent@tauex.tau.ac.il

A hard copy is in the mail.

I wish you and the project success

(Prof. Ziva Ben-Porat, Director
The Porter Institute for Poetics and Semiotics
Tel Aviv University
Ramat Aviv 69978
Israel

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Salzburg Research Forschungsgesellschaft m.b.H.
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http://www.salzburgresearch.at

Letter of Intent
between
Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III A-5020, Salzburg, Austria
and
Helsinki University of Technology
Otakaari 1 or P.O.Box 1000, FIN-02015 TKK, Finland
to participate in the proposal
European Meme and Memory Agent (EMMA)

Preamble
The Parties intend to submit a proposal related to the programme call **IST call
5 FP6-2005-IST-5 Strategic objective: 2.5.10 - Access to and preservation of
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planning etc.

Matti Pursula

(signature)

Matti Pursula, Rector

Espoo, the 15th of September, 2005

Letter of Intent to participate in the proposal European Meme and Memory Agent (EMMA)

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Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III, A-5020 Salzburg
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fbi@salzburgresearch.at
http://www.salzburgresearch.at

Letter of Intent
between
Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III A-5020, Salzburg, Austria
and
InterSoft, a. s.
Floriánska 19, 040 01 Košice, Slovak Republic
to participate in the proposal
European Meme and Memory Agent (EMMA)

Preamble
The Parties intend to submit a proposal related to the programme call **IST call
5 FP6-2005-IST-5 Strategic objective: 2.5.10 – Access to and preservation of
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planning etc.

(signature)

Martin Tomášek, managing director
(name and function)

Košice, September 12, 2005
(Place, Date)

Letter of Intent to participate in the proposal European Meme and Memory Agent (EMMA)

12.SEP.2005 15:56   INTERACTIVE INST. 08 7832460   NR.504   S.1

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Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III, A-5020 Salzburg
tel. +43-662-2288-301; fax: +43-662-2288-222
fbi@salzburgresearch.at
http://www.salzburgresearch.at

Letter of Intent
between
Salzburg Research Forschungsgesellschaft m.b.H.
Jakob-Haringer-Straße 5/III A-5020, Salzburg, Austria
and
Interactive Institute/Visions for museums
Box 24081
104 50 Stockholm
Sweden
to participate in the proposal
European Meme and Memory Agent (EMMA)

Preamble
The Parties intend to submit a proposal related to the programme call IST call
5 FP6-2005-IST-5 Strategic objective: 2.5.10 - Access to and preservation of
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previous negotiation results and the previous good constructive talks a
failure of the negotiations shall only be possible if a confident cooperation
can not be ensured any longer. **Costs:** Each Party bears its own costs
accumulated so far in connection with this letter of intent. In particular,
these include expenses for travelling, lawyers, investigations, consulting,
planning etc.

_____   /HALINA GOTTLIEB
(signature)

Letter of Intent to participate in the proposal European Meme and Memory Agent (EMMA)

Annex 5: EMMA Consortium Agreement – Draft

CONSORTIUM AGREEMENT

Project acronym: **EMMA**

Project full title:
European Meme and Memory Agent

Proposal/Contract no.: Version: **1.0**

Date:

THIS AGREEMENT is made the [date]

BETWEEN

Salzburg Research Forschungsgesellschaft m.b.H. (”the Coordinator”) established in Austria, Jakob Haringer Strasse 5/III, 5020 Salzburg;	Partner 7 established in …
[Parnter 1] established in …	Partner 7 established in …
[Partner 2] established in …	Partner 8 established in …
[Partner 3] established in …	Partner 9 established in …
Parnter 4 established in …	Partner 10 established in …
Partner 5 established in …	Partner 11 established in …
Partner 6 established in …	

(hereinafter referred to individually as the ”Party” and collectively as the ”Parties”)

WHEREAS

A. The Parties have decided to enter into a Contract with the Commission of the European Communities ("the Commission") to carry out the project entitled EMMA (referred to as the "Project") with the reference ("the EC Contract") which forms part of the Commission's Sixth Framework Programme.

and

B The Parties wish to define and establish their mutual rights and obligations in carrying out the EC Contract.

NOW IT IS HEREBY AGREED as follows:-

1	DEFINITIONS
1.1	The words and expressions defined in the EC Contract shall, except where otherwise provided or expressly defined below, have the same meaning in this Agreement.
1.2	Subject to Article 14 of the EC Contract, in the event that there is any conflict between the terms and conditions of this Agreement and those of the EC Contract then the terms and conditions of the EC Contract shall prevail.
1.3	"The Project" shall mean the EMMA project and its associated work as set out in the EC contract.
1.4	"The project account" shall mean the bank account opened by the project coordinator for the sole purpose of managing money in relation to the project, specifically the financial contribution to the work, by the EU.
1.5	"Payment schedule"; "agreed consortium payment schedule" shall mean the terms and conditions laid out in Annex 1 to the consortium agreement, which specifies how the EC advance payment is to be paid out pro-rata, to the members of the consortium.
1.6	"Project shares" shall mean the amount of money allocated to the project by each partner and added to that, the EC contribution to this partner's project funds.
1.7	"This agreement" shall mean the consortium agreement in its entirety including any annexes, as drawn up between the partners of the EMMA consortium.
1.8	"Arbitration Panel" shall mean a group of people consisting of two technologists and one legal expert who will be chosen by the parties to this agreement, to act as an independent group of expert arbitrators in best interest of the consortium.
1.9	"The EC Contract" shall mean the contract issued by the European Commission, pertaining to the project EMMA having the Project number **xxxx**

2	PERFORMANCE AND MANAGEMENT OF THE WORK
2.1	The performance of the Project shall be shared between the Parties according to the tasks indicated in Annex I to the EC Contract (the "Description of Work").
2.2	The performance of the Project shall be overseen by a Board ("the Board") comprising one representative from each of the Parties. The Board shall meet quarterly throughout the term of the EC Contract. A quorum for any meeting of the Board shall be 5 representatives. The Board can agree to use remote conferencing facilities to support its meetings as long as an agreed record of each meeting is established. The cost of providing the remote conferencing facilities is borne by the partners requesting it.

The Project core group as identified in Annex I to the Contract (Description of Work) acts as a steering group who will discuss any issues at stake prior to a board meeting and propose options for the Board to decide upon.

Each non-core group member can delegate its decision making to a core group member by written statement in advance of a board meeting (signed fax to co-ordinator accepted). Such delegation is always only valid for one specified meeting.

Each Board member can send a proxy provided the proxy person is entitled to commit to decisions within the |

	scope of the meeting agenda and is sufficiently well informed about the project state. Therefore, the proxy should be a member of the EMMA project team.
2.3	An extra-ordinary meeting of the Board can be convened by any **three** (or more) representatives giving a minimum of **seven** working days written notice of the date, time, place and agenda for such an extra-ordinary meeting (th place to be in a city of one of the Parties or in Luxembourg).
2.4	Any decision made by the Board which materially affects the performance of the EC Contract or the rights/or obligations of a particular Party or the Parties shall be subject to subsequent written agreement and ratification by the Parties.
2.5	The responsibility for administrative coordination is with Salzburg Research. The responsibility for the quality of scientific results will be divided as follows: **[add responsibilities according to workpackage leads]**

3	**COST AND PAYMENTS THROUGH THE COORDINATOR**
3.1	Each Party shall bear its costs in connection with the carrying out of Annex I to the EC Contract and Work Programme for the Project. The Commission shall make all payments in respect of its financial contribution to the Coordinator which shall be responsible for transferring the appropriate amount (if any) to the other Parties within 10 working days time from receipt thereof provided always that such payments are sanctioned by the payment schedule and conditions as specified in article 3.6 of this agreement.
3.2	The initial payment to each Party shall be the lesser of a) the amount expected from work budgeted to be completed during the period covered by the first cost statement of the Project and b) the amount a pro-rated allocation of the initial EC payment (based on the budgets relating to the cost statements) provides for each Party. Payments against subsequent cost statements will reflect any further EC payments received but otherwise will be made on the same basis, except that no payment will be made against future budgeted cost statements until the Party has provided audited cost statements acceptable to the EC for any prior periods, any overpayment is set against the new period budget and the Party has satisfied the Board that it has met its obligations under the Work Programme, and c) The Board can decide to lift these conditions in specific situations and authorise the Coordinator to make payments to an individual Party if it considers this to be in the best interest of the Parties.
3.3	Such payments shall be made by the Coordinator in EURO. The maximum amount payable by the Coordinator to the Parties (including the Coordinator) shall, in no event, exceed the financial contribution made by the Commission.
3.4	Any undistributed EC funds will be held in the project account nominated by the Coordinator. The Coordinator shall d) inform each party of the terms and conditions under which the project account is to be held and if no objection is raised within 10 working days, then e) manage the project account in such a way as to safeguard the value of any monies held against the rate of inflation as published by the European Central Bank, but with no obligation to the other parties to make good any losses made under the terms of the account, f) not make any transfer of monies from the project account unless the transfer is sanctioned by the provisions of the payment schedule as specified in Article 3.6., g) be specifically entitled to make a transfer of monies **not sanctioned** by the payment schedule **just in case all parties have agreed** to the exact transfer, in writing. Unless they have raised their objection within 10 working days, each party shall be deemed to have agreed to the terms and conditions and shall bear pro-rata, any losses incurred through unfavourable conditions

	pertaining to the agreed project account.
3.5	At the end of each month and in line with standard banking practice, from the commencement date of the contract, the Coordinator shall inform the other parties of the money held in the project account. This can be done by email or fax.
3.6	The parties agree to a specific payment scheme aimed at reducing the financial risk of each party, as follows: The initial payment will be split into four equal parts. These four parts will be paid out on a pro-rata basis in Month 2, Month 5, Month 8, and Month 11, respectively, provided the party has discharged its duties with respect to the allocated work in a satisfactory manner for the period in question. The agreed scheme is described in Annex 1 of this consortium agreement.
3.7	Payment will be subject to Quality Assurance on the work delivered as follows:
3.7.1	The co-ordinator will apply a quality assurance (QA) check to each piece of work submitted by the partners. For each piece of research work done by the co-ordinator, one other partner will be responsible for the same type of quality assurance. If the format of the QA procedure is disputed the Board will have the final decision on which format is to be used. The QA procedure must be carried out with due care according to the professional standards in the field, within 10 working days of receiving the piece of work, by email, fax or letter.
3.7.2	In the case of internal acceptance of all pieces of work, the contractor acquires the right of full payment according to the agreed consortium payment schedule.
3.7.3	In the case of reasonable revisions, 60% of the scheduled payment will be made and the rest is added to the next scheduled payment pending satisfactory revisions.

3.7.4	In the case of unacceptable work the relevant scheduled payment will be ceased until the work is rectified. In the case of damage ensuing due to unacceptable work or delays, up to three scheduled payments may be retained by the co-ordinator as a precautionary measure.
3.7.5	When a retention happens for the **first** time, the project officer must be informed by the co-ordinator. When a retention happens for the **second** time, an extra-ordinary project management meeting must be called to rectify the problem. This may lead to either the expulsion of the partner providing unacceptable work or to a shift of resources to a partner who is able to deliver the requested work at acceptable standards.
3.7.6	Penalties for delays in reporting (could also be added as Point 4.7 / covers obligations toward the PC
3.8	Change of coordinator leads to change of project account: In the case of a change of coordinator, the new coordinator **has the right to** nominate a designated project account to which the previous coordinator will transfer any EU monies relating to the project's contract, **within 5 working days** of receiving the new coordinator's project account, always provided the majority of parties has agreed to the transfer, and provided that the new coordinator has complied with **article 3.4** of this agreement.
3.9	Limited Liability of the Coordinator: Except for cases of gross negligence or deceit, the coordinator's liability towards the partners shall be limited to a maximum of €xx this being the cost of effort allocated to the coordinator for the management of the project.

4	OBLIGATIONS TOWARDS THE COORDINATOR
4.1	Each Party undertakes to supply promptly to the Coordinator of the Project all such documents and information as may be required of it in connection with the Project in order to fulfil the obligations under the EC Contracts.
4.2	Each party shall by email or fax and within the first week of each calendar month, supply the coordinator with

	a **forward look effort estimate and work planned** for the month. A template will be agreed by the parties at the first project meeting and be used subsequently. The template may be revised by mutual agreement.
4.3	Each party undertakes to supply to the Coordinator a bimonthly progress report from which it is possible to derive what actual work has been done in the project. The report will explain work done within a project task and the contribution made to deliverables where appropriate. It will be sufficiently explanatory to assess the progress made. A template will be agreed by the parties and the Project Officer at the first project meeting and be used subsequently. The template may be revised by mutual agreement, provided it is accepted by the Project Officer for official reporting.
4.4	Each party undertakes to supply to the Coordinator an unofficial cost statement after six months and after 18 months, for controlling purposes.
4.5	Each party undertakes to nominate an administrative contact who will be reachable by email and telephone and fax and whose response time will be at most **three working days** for any administrative request. The parties acknowledge that an **initial response** to any request within **one working day** is *desirable* as acknowledgement of the request. If satisfying a request will take longer than three working days, then a reason for the delay *should* be given, and an estimate for completion *must* be given, to enable the coordinator to re-plan any dependent schedule.
4.6	Each party undertakes to a) supply the Coordinator with official Cost Statements as stipulated by the EC Contract b) supply the Coordinator with unofficial Cost statements as of article 4.4 that have gone through a quality assurance process at the Party's site and which will be signed by an authorised person and which will carry the organisation's stamp or seal.

5	OBLIGATIONS TOWARDS THE PARTIES
	Each Party hereto undertakes to:
5.1	to perform on time the tasks assigned to it for the performance of the Project and to make available to the other Parties the rights and information defined in Annex II to the EC Contract
5.2	to notify promptly to the other Parties any delay (actual or foreseeable) in performance of its obligations hereunder or under the EC Contract
5.3	to prepare and present the reports and statements to be submitted to the Commission under the EC Contract in sufficient time to enable the Coordinator to submit them to the Commission as required
5.4	promptly to make any notification required under Annex II to the EC Contract.

6	RIGHTS, OBLIGATIONS AND RESPONSIBILITIES OF THE COORDINATOR
6.1	The Co-ordinator is the single point of contact between the European Commission and the Consortium. In this function the Co-ordinator shall a) sign the Contract with the European Commission after authorisation by the Parties representing at least eighty percent (80%) of the Project Shares and who have signed the Contract accession form ("Form A") and the Consortium Agreement, b) collect from all Parties the cost and other statements for submission to the European Commission, c) prepare, with the support of the members of the Project Board, the reports and project documents required by the European Commission, and d) ensure prompt delivery of all hardware, Software and data identified as deliverable items in the Contract or requested by the European Commission for reviews and audits, including the results of the financial audits prepared by independent auditors.
6.2	Pursuant to the Contract, the Co-ordinator is responsible for the following tasks and functions a) overall management of the Project with the support of a Project Team, if necessary, and b) chairing the Project Board and the Project Core Group

	c) preparation of the meetings and decisions of the Project Board and the Project Core Team, and d) preparation of the agendas for the meetings of the Project Board and the Project Core Team
6.3	The Co-ordinator shall not be entitled to act or to make legally binding declarations on behalf of any other Party. (No power of representation)
6.4	Specific Authorisation of the Co-ordinator: a) To the extent that serious concerns regarding the financial soundness of one or several Parties exist, the Co-ordinator has the authority to require the appropriate letter of comfort to prove that the corresponding Party is able to fulfil their financial obligations with regard to the Contract and this Agreement. Until this is provided, the Co-ordinator is entitled to refuse the disbursement of the financial contributions of the European Commission to this Party. No disbursement shall be refused with respect to work that the corresponding party has already provided and which has been accepted through the project's QA procedures. b) Furthermore, the Co-ordinator has the right to retain any payment if a Party is late in submitting or refuses to provide deliverables as defined in Section 5.1 of the Consortium Agreement and Contract Annex II, Article 7, or c) If one or more of the Parties is late in submitting of Project deliverables, the Co-ordinator may submit the other Parties' Project deliverables to the European Commission.
6.5	A change of coordinator takes place when the previous coordinator leaves the consortium, or by agreement with the previous coordinator and the Commission. The coordinator in lieu will then take over the full duties of the coordinator.

7	INDEMNIFYING THE OTHER PARTIES
7.1	Each Party shall indemnify the other Parties in respect of the acts and or omissions of itself and of its employees and agents and for any direct and reasonably foreseeable loss to the other Parties resulting from the failure of such Party to perform its duties and obligations either under this Agreement or under the EC Contract. Such acts do include: a) false or incomplete statements submitted by a Party in order to obtain a financial contribution of the Commission, or b) any other advantage under the EC Contract, and for which this Party may properly be held responsible.
7.2	If the Commission, in accordance with the provisions of the EC Contract claims any reimbursement, indemnity or payment of damages from one or more of the Parties:
7.2.1	each Party whose act or default has caused or contributed to the claim shall indemnify the other Parties for any sum paid by them in respect of such claim; in the event that it is not possible to attribute default to any party the amount claimed by the Commission shall be shared by the Parties in the proportions that they are to receive the financial contribution of the Commission.
7.2.2	Each Party shall be solely liable for any loss incurred by third parties resulting from the implementation by such Party of its share of the Project under the EC Contract.

8	RESPONSIBILITY FOR THE PERFORMANCE OF WORK
	Each Party shall be fully responsible for the performance of any part of its share of the work under the EC Contract on the Project in respect of which it enters into an associated contract and/or a sub-contract (as defined in Article 6 of Annex II to the EC Contract) and shall indemnify the other Party for any loss suffered as a consequence of any act or omission of any sub-contractor appointed by it under any such associated contract or sub-contract.

9	FORCE MAJEURE
	The provisions of the EC Contract relating to force majeure shall apply to this Agreement.

10	CONFIDENTIALITY.
10.1	In respect of all information (including Foreground and Background Information as defined in Annex II of the EC Contract) whether of a technical nature or otherwise relating to the business or affairs of a Party which is disclosed to the other Parties on a confidential basis hereunder or otherwise in connection with the Project, each Party undertakes to the other:
10.1.1	that it will not for a period of five years from the date of disclosure of such information use it for any purpose other than for carrying out of its obligations under this Agreement or the EC Contract.
10.1.2	that it will, during the period of five years, treat the same as (and use all reasonable endeavours to procure that the same is kept) confidential and not disclose the same to any other person without the prior written consent of the relevant Party. PROVIDED ALWAYS that:
10.1.3	such undertakings shall not be deemed to extend to any information which the relevant Party can show:
10.1.4	a) was at the time of receipt published or otherwise generally available to the public; or b) has after receipt been published or become generally available to the public, otherwise than through an act or omission on the part of the receiving party; or c) was already in the possession of the receiving party at the time of receipt without any restriction on disclosure; or d) was acquired from others without any undertaking of confidentiality imposed by the disclosing party; or e) was developed independently of the work under the EC Contract by the receiving party.
10.1.5	Nothing herein contained shall prevent the communication by each Party of such information to the Commission in performance of its obligations under the EC Contract or (against similar undertakings of confidentiality) to any affiliated company (as defined in Annex II to the EC Contract) or to any permitted third party insofar as is necessary for the fulfilment of the EC Contract and/or the legitimate exploitation of the results of the Project as may be provided for in the EC Contract.

11	INTELLECTUAL PROPERTY RIGHTS
	Any property rights in the results of the work carried out under the EC Contract shall be owned by the Party generating the results subject to the rights and obligations concerning the grant of licences set out in Annex II to the EC Contract.
11.1	Access to Knowledge: Access to knowledge shall be granted as defined in Annex II to the core contract, Article 35. Where access to knowledge leads to substantial commercial benefits for any of the parties, the other parties may seek royalties from the benefiting party as set out in Article 12 of this consortium agreement.

11.2	Pre-existing Knowledge
	Each Party undertakes to
	a) provide a summary paper and presentation before the kick-off meeting of the project, which will establish the baseline of pre-existing knowledge of the party at the beginning of the project
	b) within the first twelve months of the project, take part in and subsequently agree to an Annex 2 to this consortium agreement, which specifies mutually agreed joint property rights with regard to the results of the EMMA project.
	c) between month 12 and month 20 of the project, revise Annex 2 with a view to consolidating the joint property rights for subsequent use and exploitation as the parties see fit.
	Any property rights agreed to must be in line with the provisions set out in the EC contract and any annex thereof.
11.3	Joint ownership of inventions:
	If, in the course of carrying out work on the Project, a joint invention, design or work is made - and more than one Party is contributor to it - and if the features of such joint invention design or work are such that it is not possible to separate them for the purpose of applying for, obtaining and/or maintaining the relevant patent protection or any other Intellectual Property Right, the Parties concerned agree that they may jointly apply to obtain and/or maintain the relevant right together with any other parties.
	The Parties concerned shall seek to agree amongst themselves arrangements for applying for, obtaining and/or maintaining such right on a case-by-case basis. So long as any such right is in force, each Party concerned shall be entitled to use and to license such right without the consent of the other Parties, provided that the Party concerned shall be informed in advance of any licensing to
	third parties. In case of licensing to third parties, appropriate financial compensation shall be given to the other Parties concerned.

12	ROYALTIES DUE TO SUBSTANTIAL COMMERCIAL BENEFITS.
12.1	CA parties agree to specify a royalties system for cases of substantial commercial benefit, to be drawn up once first results of the project (latest after 12 months) are known so as to assess these results.
12.2	CA parties agree to specify a distribution of IPR at the same time as 1), and that this IPR distribution will be used as the guide for royalties distribution.
12.3	CA parties agree on an arbitration panel consisting of two technologists and one legal advisor, which - in the case of non-agreement in point 12.2 will deliberate a fair IPR distribution on the basis of project results and evidence submitted by parties.
12.4	CA parties agree that the decision of the arbitration panel will be legal and binding.
12.5	CA parties agree that in the absence of any other agreement or arbitration decision, IPR distribution will be equal among partners.
12.6	The Parties are free to choose mutually agreeable other arrangements with respect to substantial commercial benefits. Such other agreements have to be made in writing and must not adversely affect any other party's rights defined under this agreement. In the case of disagreement whether or not a mutual agreement will adversely affect another party's rights, the decision shall be delegated to the arbitration panel defined in 12.3.

13	BREACH OF TERMS AND REMEDIES.
13.1	In the event of a breach of any of the terms of this Agreement or of the EC Contract by either Party which is not capable of remedy or which (being capable of remedy) is not remedied within sixty days of written notice from another Party or other Parties specifying the breach and requiring it to be remedied the other Party not in breach may subject to the Commission's consent serve notice to terminate this Agreement with respect to the Party in default by not less than one month's prior written notice and the Party in default shall be deemed to have agreed to the termination of the EC Contract in respect of its participation PROVIDED

	ALWAYS that:-
13.1.1	the licences granted under the terms of Annex II to the EC Contract to the Party in default shall cease immediately but the licences so granted by the Party in default to the other Parties shall remain in full force and effect;
13.1.2	the tasks of the Party in default for the performance of the work on the Project shall be assigned to such other entity or company as the remaining Parties may choose and to which the Commission may agree on the terms of the EC Contract and this Agreement and the Party in default shall be responsible for the costs of such assignment.

14	**DURATION OF THE CONSORTIUM AGREEMENT.**
14.1	This Agreement shall come into effect upon the date stated in the preamble hereof or the date upon which the Parties commenced work on the Project (whichever shall be the earlier) and shall continue until complete discharge of all obligations undertaken by the Parties under the EC Contract and under this agreement including any amendments or extensions thereto as may be mutually agreed in writing by the Parties.
14.2	No Party shall withdraw from or terminate this Agreement and/or its participation in the Project unless:
14.2.1	it has obtained the prior written consent of the other Parties; or
14.2.2	that Party's participation in the EC Contract is terminated by the Commission pursuant to the provisions of Article 16 of Annex II to the EC Contract.

15	**NO CREATION OF AGENCY.**
	Nothing in this Agreement shall be deemed to create a partnership or agency between the Parties. Neither Party shall be empowered or entitled to commit the other Parties to any obligation or liability under the EC Contract or otherwise without having first secured the prior written permission of the concerned Party.

16	**TRANSFER OF RIGHTS.**
	Neither Party shall without the prior written consent of the other Parties assign or otherwise transfer any of its rights and obligations hereunder.

17	**COMMUNICATION WITH THE COMMISSION.**
	All correspondence between the Parties and the Commission pursuant to the EC Contract shall be directed through the Coordinator. To the extent that it is relevant to the other Parties it shall be copied to them along with replies received.
	Proposed variations or amendments to the EC Contract shall be discussed and agreed to in writing between the Parties prior to submission to the Commission.

18	**DISPUTES, GOVERNING LAW AND LANGUAGE.**
	Any dispute arising out of or in connection with this Agreement, including any question regarding its existence, validity or termination, shall be referred to and finally resolved by arbitration under the Rules of the **Commercial Court in Vienna,** which Rules are deemed to be incorporated by reference into this Article. The governing law of the Agreement shall be the substantive law of Austria.
	In the event of any arbitration under this Article the arbitration panel shall consist of 3 (three) arbitrators of which 2 (two) shall be nominated by the Parties and one by the president of the Commercial Court. The place of the arbitration shall be Vienna and the language of the arbitration shall be English. The findings of the

	arbitration panel with respect to the scope of this agreement, shall be final and binding for the parties.

19	PURPOSE AND SCOPE.
19.1	The purpose of this consortium agreement is to ensure that all parties will ensure the success of the project through due care and diligence in their work and in their professional behaviour towards each other.
19.2	The scope of this consortium agreement is the project and any products or further research derived from the knowledge gained in the project.

20	ENTIRE AGREEMENT - AMENDMENTS / SEVERABILITY.
	Should any provision of this Consortium Agreement prove to be invalid or incapable of fulfilment, or subsequently become invalid or incapable of fulfilment, whether in whole or in part, this shall not affect the validity of the remaining provisions of this Consortium Agreement. In such a case, the Contractors shall be entitled to demand that a valid and practicable provision be negotiated which mostly fulfils the purpose of the invalid or impracticable provision.
	This Consortium Agreement, the Contract and - when such exist(s) - Complementary Contract(s), constitute the entire agreement between the Parties in respect of the Project, and supersede all previous negotiations, commitments and writings concerning the Project including any memorandum of understanding between the Parties (whether or not with others) which relate to the Project or its proposal to the Commission.
	Amendments or changes to this Consortium Agreement shall be valid only if made in writing and signed by an authorised signatory of each of the Parties.

21	ACCESSION TO THE CONTRACT.
	All Parties declare that they have taken notice of all provisions of the Contract and its Annexes, which they have approved and have taken notice of all Sections of this Consortium Agreement. Therefore, through signature of this Consortium Agreement, the parties are obliged to accede to the Contract by submission of their Forms A to the Co-ordinator.

22	COUNTERPARTS.
	This Consortium Agreement may be executed in any number of counterparts, each which shall be deemed an original, but all of which shall constitute one and the same instrument.

The parties signing this Consortium Agreement also declare that ANNEX 1, the RISK MANAGEMENT PLAN shall be in force for the duration of the project.

IN WITNESS whereof the Parties have caused this Agreement to be duly executed by their appointed representatives the day and year first before written.

---	--
Signed by <Partner representative> for and on behalf of [Partner name]	Signed by <Partner representative> for and on behalf of [Partner name]
--	--

Signed by <Partner representative> for and on behalf of [Partner name]	Signed by <Partner representative> for and on behalf of [Partner name]
--- Signed by <Partner representative> for and on behalf of [Partner name]	--- Signed by <Partner representative> for and on behalf of [Partner name]
--- Signed by <Partner representative> for and on behalf of [Partner name]	--- Signed by <Partner representative> for and on behalf of [Partner name]
--- Signed by <Partner representative> for and on behalf of [Partner name]	--- Signed by <Partner representative> for and on behalf of [Partner name]
--- Signed by Univ. Doz. Dr Siegfried Reich for and on behalf of Salzburg Research Forschungsgesellschaft m.b.H. (”the Coordinator”)	

Annex 6: Preliminary list of CH technology vendors for EMMA technology road show

Innovae Vision **http://www.innovaevision.com/**	INNOVAE VISION - A new way of human-machine interaction for museums Innovae Vision is a recently created company dedicated to the design and development of interactive modules and ad-hoc projects based on Computer Vision and Robotics. These developments are aimed at science museums and other cultural and scientific learning environments.
Google Zurich: European research and development centre	The world's leading internet search engine, Google
DigiTOOL **http://www.exlibrisgroup.com/digitool.htm**	DigiTool is an enterprise solution for the management of digital assets in libraries and academic environments. DigiTool enables institutions to create, manage, preserve, and share locally administered digital collections. By improving the integration of digital collections with institutional portals and e-learning systems, institutions running DigiTool provide users with a seamless working environment.
Iart interactive ag **http://www.iartinteractive.com/**	iart- planning, expertise and realisation for the convergence of exhibition, art and technology.
Klipp og Lim Media AS, Norway	Klipp og Lim delievers a broad spectre of communication solutions, ranging from print to digital work.
Oxford ArchDigital	Oxford ArchDigital (OAD) is a spin-out company from the Institute of Archaeology at Oxford University, focusing on content management solutions that allow our customers to create, manage and present their data online. Customers include local authorities, museums, libraries, archaeological trusts, government bodies and EU projects.
FabriqueB.V. http://www.fabrique.nl	Fabrique is a design agency for graphic design, industrial design, new media and new business. Fabrique's core business is designing, but it also looks at the strategic level and helps its clients realise solutions.
zetcom AG Berlin http://www.zetcom.com	zetcom AG is a flexible, high-powered computer science service enterprise concentrating on Museum Management- and Conservation Solutions. zetcom AG develops job oriented computer science solutions based on standard products.