BRIDGE

Enabling Multimedia in the Semantic Web

17 October 2001

Proposal No: IST-2001-34085

Part C:

Description of contribution to EC policies, economic development, management and participants

C2. Table of Contents

C3. Community added value and contribution to EC

The WWW provides a new environment for global information production, distribution and access and thus is the key market for the information society. It is the belief of the BRIDGE project that the Semantic Web will only unleash its full potential if the borders of different communities are crossed and their standards, tools, experience, and competence are brought together: multimedia, metadata, and ontologies From a European perspective it is important to strengthen the European presence not only with respect to information technology and related standardisation bodies but also with valuable information. Both of these aspects are provided by BRIDGE.

BRIDGE' concept of an infrastructure offering **generic, integrated semantic services on media content**, **metadata, and ontological knowledge** will allow domain experts to improve their work through **swift creation of highly qualitative and reliable multimedia-based information**, and thus **facilitate instant distribution to the global consumer** who will be provided with **the right information at the right time** through services, such as effective searching, individualized visualization and advice, etc. The semantic services will make use of standards as far as possible to facilitate the **seamless integration in the heterogeneous environment of the World Wide Web**. In fact, CWI and FZI have been key players in creating the multimedia standards SMIL and MPEG-7, as well as in building some of the most sophisticated existing Semantic Web tools (Ontobroker, OntoMat, Semantic portal – SEAL). Thus, BRIDGE contributes to the implementation of the EU policy to support interoperability and standards. The technology and information representation structures developed in BRIDGE will provide the European knowledge space industry with the means to become key figures in the new market of the semantic web because they will shape its economical and technological structure.

The applicability of the results of the project is not limited to any single national market. The proposed approach **fosters the development of European-wide applications and service**, since it facilitates the provisioning of next-generation multimedia information spaces such as needed in many commercial sectors, from retailing to pollution control. Thus, the project has a good representation in a wide range of European countries – reflecting the need for and the possibilities that will be achieved out of the project.

This requires, of course, that the information space providers have to cover a variety of domains supported by a large number of domain experts – which offers **community value achieved by facilitating scientific cooperation across European borders** through the provision of a forum – the information space – in which experts can contribute to by analysing, documenting and making accessible to a wide European and actually world public important information. Appropriate use of ontologies are recognised as an essential technology as part of the Semantic Web. Through its multimedia ontology research, **BRIDGE will be the first project of its kind to explore and test semantic-web technologies and emerging standards for the benefit of multimedia scenarios and applications.**

Though only the application domain, BRIDGE project addresses information on fine arts in museum environments and thus addresses issues of European heritage, an inherently and pre-eminently European concern. The domain to be regarded more intensively as a case study for the BRIDGE information space will also provide added community value by allowing more insight into valuable resource on hardly ever seen fine art items, where the exploration of 'intertextuality' offered by digital media, i.e. creating new formats and new possibilities of cross reference and analysis, is in effect a qualitative shift fine art studies in general. In other words, through BRIDGE' technology, scientists and scholars from all over Europe will be provided with multimedia-based tools allowing them to better discuss, annotate, study and advise on fine art. Communication with other collaborators will be provided through the Internet. Thus **BRIDGE will also benefit Europe by creating innovative multimedia tools** which will also be generically usable in other scientific communities wishing to collaborate using today's electronic means. Thus in terms of both content and method, we believe that BRIDGE will make a contribution to European cultural heritage on the one hand, and to European competitiveness on the other hand, i.e. the technology of the evolving information space, will help keep Europe up to date in the fast-moving area of electronic media-based information applications.

The European level of the BRIDGE project will enhance all results, and make some of them possible in the first place. An electronic environment for multimedia-based information spaces is a very technology-intensive undertaking, and requires know-how from several areas of computer science.

The Consortium is composed of complementary partners (see Section C.6) from 3 different European countries, which cover all the required expertise for the project. The set of skills of the partners is both necessary and sufficient for carrying out the proposed work, and for the commercialization of the project results. The project unites Europe's leading institutes in the fields of automatic user centred web presentation generation (CWI), knowledge representation and ontologies (FZI), meta-description of audio-visual content (CWI and Vienna University) and E-Commerce (Vienna University). The involvement of three partners in standardization bodies such as W3C (CWI, SMIL, Xlink, XHTML; FZI, Semantic Web activities) and ISO (CWI and Vienna University in MPEG-7) will further strengthen the European influence on relevant technology development.

In addition to the necessity of technology providing partners in BRIDGE, the fact that a leading European business-providing partner for electronic information space management could be won will also give BRIDGE a head start in accomplishing project goals. I-views is one of Europe's most experienced information space management supplier. In this respect Giunti will provide its expertise to the achievement of BRIDGE' goals not only to secure its survival in the turmoil of electronic information handling but also to enhance the European knowledge space industry.

Complementing the technological and economic aspects of BRIDGE, two leading European Museums for fine art (Albertina and Kunsthistorisches Museum) are project partners. Both museums offer large digitised collections of graphic and art, covering all of the major art-historical epochs from Ancient Egyptian and Greek and Roman Antiquities to the contemporary Modern. Moreover, both institutions do not only maintain and extend these magnificent collections but also perform research on a large scale regarding technique, provenance, function, and significance of covered epochs. The BRIDGE environment will ease the required scholarly exchange by providing an electronic forum with high-quality media units and well-thought-out tools for annotation and similar processes used by scholars. Complementing the collections of the museum themselves, which together harbour a vast treasure of artefacts and, above all, secondary literature of all kinds on their treasures, each of the participating content providers has, through existing cooperation with other similar institutions and memberships in international organizations, access to further relevant material throughout Europe which will also be available to BRIDGE.

We think the consortium is well rounded in a way only possible on an overall European level.

C4. Contribution to Community social objectives

The BRDIGE project will provide empowering technology that will allow to design, develop, and deploy new multimedia applications, at a fraction of the present cost and with an improved speed. BRIDGE will provide the necessary technology for small service providers to easily integrate into a heterogeneous network of large information providers, opening up new possibilities for SMEs at near zero entry costs.

The technological developments of the BRIDGE project will offer the **European knowledge space industry** a decentralized way of working with domain experts, improving the distribution speed of high quality information, and increasing the potential circle of customers from a national to international level, by decreasing at the same time the current use of natural resources, i.e. paper, water, thus contributing directly to preservation of the environment.

BRIDGE will have a direct impact on the working conditions and thus contribute to improve the **quality of life and health and safety**. The individual is given the power of his own view for contributing knowledge to the information space by using the technological development of the BRIDGE project that offers sophisticated support via the Internet for decentralized collaboration. In such a way the individual will not only have access to professional associates and to a wealth of information on their subject, they will also as a collective group be able to produce results which might otherwise not be possible.

Making the results of domain specialists more visible to the general public and more highly disseminated, we hope as well that BRIDGE will contribute to **creating and preserving employment** in culturally important areas that might otherwise be neglected as not "profitable". By applying leading edge technology BRIDGE will also indirectly contribute to long-term employment prospects in Europe.

BRIDGE does not directly address environmental problems. However, the technologies in which the project is based are general enough to be applied in a wide variety of domains, allowing knowledge workers to **reduce their commuting expenses** - thus contributing indirectly to **preservation of the environment**.

We also believe that the high quality and reliability of the provided information in combination with the easy and user-centric access, can contribute to quality of life in the sense that any clarification supports the live long learning process of the European citizens and also provides the European view on particular domains on a global, worldwide scale.

C5. Project management

Project management structure

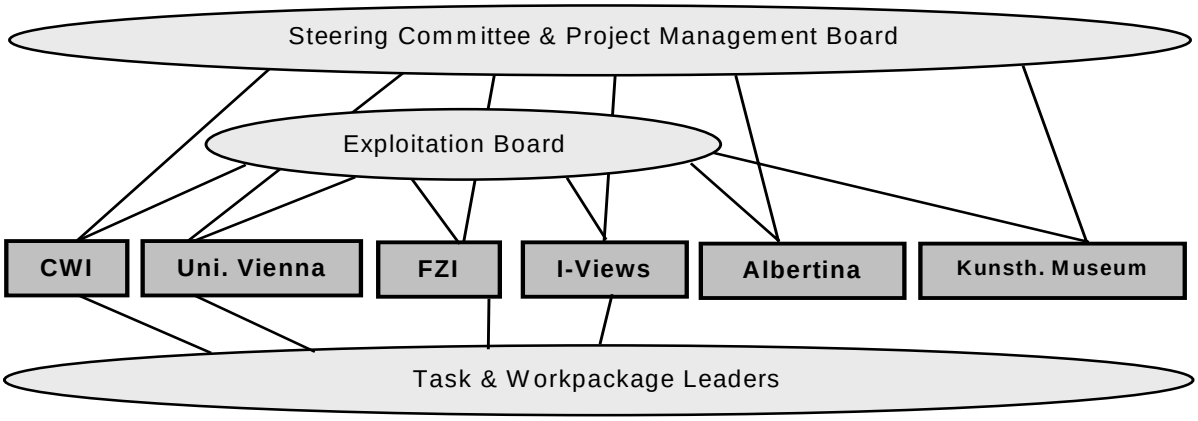
Project management activities are covered by the dedicated Workpackage 1. The objective of this workpackage is twofold: to ensure that the partners are constantly in communication and share their obtained results within the consortium, and to provide the project coordinator and the Community reviewers with a transparent means to oversee progress. To both these ends semi-annual Project Management Reports (PMR) will be written, marking the developmental milestones of the project. At the end of the development, a final Project Report (PR) will be provided. It will include a compilation of the conclusions obtained in the other activities, an integrative analysis of the system's results, introducing recommendations about the possible next research paths and evolution steps which may arise from the project.

The management structure techniques and procedures to be applied have the following objectives:

- to manage and control the project's resources, schedules and activities,
- to ensure the integration of the business and software related tasks,
- to check the consistency between the development and the strategic objectives of the partners,
- to ensure the overall quality of all systems and results.

The management structure will be based on a reduced number of boards and members, with the objective of improving the overall flexibility and swiftness of the decision-making process. These are:

- **Steering Committee**: Composed of one senior representative of each partner. It will be responsible for global supervision, and decisions in case of problems at lower levels. All conflicting situations that may appear in the project and are not solved autonomously will be settled in this committee.
- **Project Management Board**: Formed by the Project Coordinator and one representative from each partner; it will be responsible for overall management: technical management, revision of internal and external publications, major decisions regarding the work contents, self-assessment, information dissemination and relationship with EU officers and third party organisation.
- **Exploitation Board**: Formed by the Project Coordinator and one management or marketing representative from each of the content providers/users and the commercial partner.
- **Task and Workpackage Leaders**: Each task will be responsible for its specific actions and results. For each workpackage, one of the Task Leaders will also be nominated as Workpackage Leader.



Project management will benefit from the experience and expertise in conducting European projects possessed by CWI (financial and administrative project management) in all managerial aspects such as reporting, financial coordination, and planning tasks. The technical project management will be carried out by Vienna University.

Quality assurance procedures

The following general quality assurance procedures will be implemented:

- The deliverables will be issued by the Workpackage Leaders, and released by the Coordinator after QA revision. A normalised deliverable form and structure will be defined.
- The project meetings will be organised by the Boards and Workpackage Leaders, according to the needs of the project, and will require a previous agenda plus the meeting minutes in a pre-normalised form, for comments and approval of the attendants. All project milestones will be marked by a meeting between the Coordinator and the involved Workpackage Leaders.
- An escalation procedure will be established determining the resolution flow of conflicts that could arise.

Allocation of management responsibilites

CWI as Coordinator for the financial and administrative project management will assume overall managerial duties such as reporting, finances, and planning and organization. Vienna University as Coordinator for the technical project management will be responsibility for the project management, especially for the coodiantion of the technical software integration.

The Project Coordinators will keep account of:

- production and consolidation of periodic progress reports, and co-ordination of the final project report;
- cost statements consolidation, and financial coordination;
- scheduling of project resources, and surveillance of resources and work content deviations;
- interfacing the EC officers and external reviewers, coordination of the periodic progress reviews;
- internal storage and dissemination of the information (communication strategy), plus any other common effort related to a given task.

Albertina and Kunsthistorisches Museum will assist the Project Coordinators in the coordination of content-related matters, and in this respect will be the focal point for the content providers and users in the BRIDGE project.

A Consortium Agreement clearly stating the management, responsibility and exploitation issues, including intellectual property and commercialization rights will be signed by the partners before the project start. The key persons (Task and Workpackage Leaders) will be determined at the kick-off meeting. The Consortium will propose periodic six-monthly Review Meetings with EU officers, to be coordinated with the release of the semi-annual Project Management Reports, but will be open to any other schedule proposed by the EU.

Conflict Resolution

An escalation procedure will be established determining the resolution flow of any conflict that could arise. This procedure will contain guidelines (to be agreed in the kick-off meeting) based on the following conditions:

- A conflict will only be considered when communicated and fully documented through the established procedure.
- Depending on the conflict type (technical, administrative or management), and if it is local to the task and its associated partners, or can also impact other tasks/partners, it will have different treatments.
- The original and current level of the problem (Task, Workpackage, Project, Steering Committee) will be taken into consideration in its resolution.
- At each level an agreement between the parties will be sought. If this is finally not possible, it will be escalated to the next upper level. If any conflict is eventually not solved at the Steering Committee level, it will be escalated to the EC.

C6. Description of the consortium

The BRIDGE consortium consists of two *users/content providers* (major European museums for the fine arts), three *technology suppliers* (distinguished research institutes and universities from The Netherlands, Germany, and Austria) and one *commercial development partner* from Germany.

The two content providers and main preceding users of the digital BRIDGE content development and publishing environment are (their profiles and contributions to the BRIDGE project will be described in detail in the next section):

- **Albertina**, Austria (maintains one of the largest and most valuable collections of graphic art, covering the major epochs from the late Gothic to the contemporary Modern)
- **Kunsthistorisches Museum** – Austria (large collections of monuments, antiques, and pictures of major art-historical epochs from the Ancient Egyptian the 17th century)

One partner is mainly concerned with the commercial aspects of the BRIDGE project, e.g., the economic model:

- **intelligent views** – Germany (Knowledge management / Semantic Web technology provider)

The other three partners' roles and functions in the BRIDGE consortium can be summarized as follows:

- **CWI – Stichting Centrum voor Wiskunde en Informatica** – NETHERLANDS (the national research lab for computer science; coordinating/administration partner, technology provider & research partner)

CWI has successfully conducted European, other international and national projects, is actively involved in university teaching and produces many scientific publications each year. CWI-INS2's interest in BRIDGE is in applying innovative methods for multimedia presentation generation, task-based human-computer interaction, user interface design to application-oriented cultural web presentation, and content description modelling of media information. Exploitation will be in the form of publication of project results at international conferences, workshops and scientific journals and in university-level teaching, but also in reuse of the developed technologies (software, interfaces, etc.) for other projects and products.

- **University of Vienna, Institute for Computer Science and Business Informatics –** AUSTRIA (technical coordinator, technology provider & research partner)

The group at the University of Vienna, directed by Prof. Wolfgang Klas, contributes expertise in multimedia document models, multimedia information systems, metadata management and user profiling stemming from many years of involvement in multimedia research, including former research activities at GMD-IPSI, the University of Ulm, Germany. These research activities are complemented by the involvement of the international standardization effort on the e-commerce standard ebXML, which may play a significant role in commercelising digital content in future. The group is and has been involved in many international and national research projects. The University of Vienna's interest in BRIDGE is on the development and application of multimedia information system technology in the context of the next generation of semantic-based web technology. The projects results will be exploited in terms of scientific publications, in the context of teaching and in the context of the institute's technology transfer activities.

- **FZI –** GERMANY (technology provider & research partner)

FZI's role, as one of the technology providers and research partner, is the further development of ontology and metadata technology and its extension to multimedia data. FZI builds on existing work done in related projects, e.g. ontology engineering environments and metadata management tools, and tries to adopt the existing work for multimedia data to bring the Multimedia Semantic Web to its full potential. The development strains will be based on previous research on RDF and DAML+OIL. From the research point of view FZI is interested in means that allow the semi-automatic annotation of multimedia data using existing feature extraction algorithms. FZI is also interested to define new RDF language layers with specific focus on multimedia modeling primitives. Furthermore, FZI will also play a significant role in the test and integration of all BRIDGE system modules.

C7. Description of the participants

1. CWI – Stichting Centrum voor Wiskunde en Informatica

CWI is a private, non-profit research institute that aims at fostering mathematics and computer science research in The Netherlands. CWI receives a subsidy from the Netherlands Organization for Scientific Research NWO, amounting to about 70% of the institute's total income. The remaining 30% is obtained through national research programmes, international programmes and contract research commissioned by industry.

CWI's mission is twofold: to perform frontier research in mathematics and computer science, and to transfer new knowledge in these fields to society in general and trade and industry in particular. CWI's mission is realized by several means. In addition to the standard ways of disseminating scientific knowledge, for example through publications, presentations at conferences, organization of workshops and exchange of researchers, CWI actively pursues joint projects with external partners, provides consulting services and actively stimulates the creation of spin-off companies. A technology transfer event is organized annually to promote this side of CWI's activities. Also special efforts are made to make research results known to non-specialist circles, ranging from researchers in other disciplines to the public at large. CWI has many contacts with national organizations for applied research with wide experience in turning research results directly into practical applications. State-of-the-art computing facilities and a library of national importance support its researchers.

CWI has always been very successful in securing a considerable participation in European research programs (ESPRIT, ACTS, TELEMATICS, BRITE, TMR, IST and others) and has extensive experience in managing these international collaborative research efforts. CWI is also strongly embedded in Dutch university research: about twenty of its senior researchers hold part-time positions as university professors and several projects are carried out in cooperation with university research groups. Annually CWI hosts some 200 visiting scientists from abroad. CWI has a staff of 210 fte (full time equivalent), 160 of whom are scientific staff. CWI operates on an annual budget of NLG 28M (EURO 13M).

The cluster **Information Systems (INS)** pursues research in areas that bridge the gap between theoretical and experimental computer science. The cluster has a longstanding international reputation in the design of algorithms for distributed systems, and in descriptive complexity theory and its applications, cryptography, and parallel database technology. More recently, machine learning, multi-media systems, and data mining have become a focal point of activity and increased international attention. Besides other themes in the cluster, i.e. Data Mining and Knowledge Discovery, Interactive Information Engineering and Quantum Computing and Advanced Systems Research, the theme Multimedia and Human-Computer Interaction is concerned with research on authoring tools allowing the creation of multimedia presentations for the web by multimedia developers, rather than programmers. This, however, still requires a large amount of human effort. In addition, the diversity of end-users, and their platforms, connected to the Internet is only increasing, putting even larger burdens on producing content. For cost effective development and maintenance of such a wide variety of presentations, the group is currently investigating models and tools for automatic generation of high-quality hypermedia presentations, taking into account user characteristics, platform-specific requirements and network conditions. The **Multimedia and Human-Computer Interaction group** (INS2) has been involved with the development of models and authoring systems for multimedia and hypermedia since the early 1990's. 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 are also active in W3C's HTML and SYMM Working Groups and ISO's MPEG7 DDL Working Group.

CWI-INS has participated in a number of international projects and national (industry funded) projects during the last few years, for example:

- Multimedia Authoring Systems

- Distributed Multimedia Applications
- Interactive Structured Documents
- Specification of Secure Protocols
- Semi-automatic Hypermedia Presentation Generation (Dynamo)
- Real-Time Internet Platform Architecture (RTIPA)
- TOKEN2000
- Usability of Web-based Information Services for Hypermedia (UWISH)

Participation in the project

CWI's role, as one of the technology providers, is to apply research on automatic constraint-based web presentation generation, user modeling, user interface design, application of adaptive and dynamic multimedia to presentation styles, and query generation for the design and implementation of the BRIDGE environment. The development strains will be based on previous research on SMIL and XHTML. Finally, CWI will play a significant role in the test and integration of all BRIDGE system modules.

Curricula Vitae

Dr. Frank Nack is a senior researcher at CWI, currently working within the Multimedia and Human-Computer Interaction group. He obtained his Ph.D. in 'The Application of Video Semantics and Theme Representation for Automated Film Editing', at Lancaster University, UK. The main thrust of his research is on video representation, digital video production, multimedia systems which enhance human communication and creativity, interactive storytelling and media-networked oriented agent technology. He is an active member of the MPEG-7 standardisation group where he served as 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.

Dr. Lynda Hardman Dr. Lynda Hardman is currently leading the Multimedia and Human-Coputer Interaction group at CWI. Her interests include hypermedia reference models, description languages for hypermedia documents and multimedia authoring systems. Her PhD thesis "Modelling and Authoring Hypermedia" was obtained from the University of Amsterdam. Her current research includes the application of semantically annotated multimedia information to the automated authoring of hypermedia presentations. She is one of the co-authors of the W3C SMIL 1.0 recommendation.

Joost Geurts took his master degree in Artificial Intelligence from the Vrije Universiteit in Amsterdam in 2001. Since October 2001 he is employed at CWI's Multimedia and Human-Computer Interaction group. He is working on automatic multi/hyper media presentation generation for large information spaces.

2. University of Vienna

The University of Vienna, Austria, is the largest university in Austria. It comprises eight faculties consisting of 172 departments including 28 Clinics. The University employs a staff of 8,835 people engaged in research, teaching and administration and serves about 87,000 students, of whom more than 12% are from foreign countries.

The University of Vienna is the oldest university in the German linguistic and cultural territory. The Institut for Computer Science and Business Informatics at the University of Vienna is actively involved in research in the area of information systems on both the formal modelling and systems design aspects as well as the development and implementation of tools for the various application fields of information systems.

The group of Prof. Klas participating in this project is focusing its research on multimedia systems and tools as well as on E-commerce applications. In the context of the project the group provides its expertise in multimedia document models and their application and multimedia repository technology. The group is involved in the following national/international projects: EU project CULTOS (IST-2000-28134): Cultural Units of Learning – Tools and Services, EU project REGNET - Cultural Heritage in Regional Networks (IST 2000-26336), international projects CARDIO-OP, Lamedica, partially funded by the German Ministry of Research and Education, and is scientific partner in the national industrial Competence Centre (K_{ind}) on New Media, and in an industrial cooperation project with ASCOM.

Participation in the project

The University of Vienna's role, as one of the technology providers, is to take over the research on the management of and access to media data, metadata, and user context for the design and implementation of the BRIDGE environment. The development will be based on previous research on multimedia information management systems. Multimedia document models as well as publiation models for digital content. In addition University of Vienna will take part in the integration, test, and evaluation of the BRIDGE application demonstrator.

Curricula Vitae

Prof. Dr Wolfgang Klas. Prof. Klas is currently Professor of Computer Science at University of Vienna, Austria, leading the group "Multimediale Informationssysteme". From 1996 – 2000 he was Professor at the University of Ulm, Germany. Before that he was Post-Doctoral Fellow at the International Computer Science Institute (ICSI), University of California at Berkeley, USA and Head of the VODAK (Distributed object-oriented database system) department at GMD-IPSI, Darmstadt, Germany. From 1987 – 2001 he led: various international and national research projects with external funding, including EU projects CULTOS (IST-2000-28134): Cultural Units of Learning – Tools and Services, REGNET - Cultural Heritage in Reginal Networks (IST-2000-26336), RMP - Rural Market Place, ESPRIT IRO-DB (EP8629): Interoperable Relational and Object Databases, ESPRIT LTR TRANSCOOP (EP8012): Transaction Management for Cooperative Systems, ESPRIT LTR HERMES (EP9141), Foundations of High Performance Multimedia Information Management Systems; national projects on multimedia document modeling and archives (Cardio-OP, Lamedica, GAMMA, POLAR, POLIWORK), on multimedia extensions for workflow systems (VORTEL), and multimedia database system support for advanced applications like drug design (DOCKING), systems engineering (MUSE), and electronic publishing (HyperStorm); development of the open object-oriented database system VODAK and its multimedia extensions (AMOS). His professional activities cover Lecturing courses on database systems, non-standard database systems, and multimedia information systems technology at the Technical University of Darmstadt, the University of Frankfurt, and the Technical University of Vienna. Six tutorials on multimedia information systems, object-oriented databases, and integrated systems, and many seminars and invited talks on these subjects. Program co-chair of the ACM Multimedia 2001 and the IEEE International Conference on Multimedia Computing and Systems, 1996. Member of IFIP TC2 WG2.6 "Database Systems" and the IEEE TC on Multimedia Computing (untill 1998). Program Committee Member of various international conferences. He also directs

consulting and technology transfer projects at Steinbeis Technologietransferzentrum "Datenbanken, Multimedia, Workflow-Management und Verteilte Anwendungen", c/o University of Ulm. Prof. Dr. Klas has published over 40 papers in international journals, conferences, and books.

Dr. Susanne Boll. Dr. Boll received her MSc. in Computing Science from the Technical University of Darmstadt, Germany, in 1995. Since then she worked as a research assistant at GMD IPSI, University of Ulm and University of Vienna, where she received her PhD in October 2001. Here research interests cover such fields as multimedia information systems, database-driven Internet-based information systems, E-Commerce systems, integration of presentation services with multimedia database technology, multimedia document models, adaptive multimedia documents, personalization of multimedia content. Susanne Boll is program committee member of the RIDE 2001 and the Multimedia Modeling 2001. She has published several papers in international journals, conferences, workshops, and books.

Utz Westermann. Mr. Westermann received his MSc. in Computing Science from the University of Ulm, Germany, in 1998. From then on he worked at the same University as a teaching assistant. Since the year 2000 he is employed as a research assistant at the Vienna University. His research interests cover the fields multimedia database systems, non-standard database systems, metadata standards, XML. Utz Westermann has published several papers in international journals, conferences, and workshops.

Sonja Zillner. Mrs. Zillner received her MSc in Mathematics from the University of Freiburg in 1999. Since then she works as a research assistant at Vienna University. Her research interests cover the domains E-Commerce, Personalisation, Multimedia. Mrs Zillner participates in an Austrian project on a web museum (Bhutan -a virtual exhibition)

As subcontractor:

ICCM - International Centre for Culture and Management
Gyllenstormstrasse 8
A 5026 Salzburg-Aigen, Austria
Phone: +43 (0) 662 45 98 41
Fax: +43 (0) 662 45 98 38

Prof. Dr. Peter A. Bruck. Prof. Bruck is an internationally know specialist in new economy, media and telecommunications. He studied law, economics, sociology and communications at universities in Austria, USA and Canada and held professorships at Carleton University, Ottawa, University of Salzburg, the Hebrew University and others. He has founded the Polytechnic University for Applied Information and Communication Studies in Salzburg, and headed a number of IT and multimedia research organisations. He is founder of the European Multimedia award for best practice in e-content creation, EuroPrix MultiMediaArt, special advisor on new media industries to Arthur D. Little, Europe, and directing the interactive media development for the Austrian Telekom Group. He is also managing director of the ICCM-International Centre for Culture and Management and its New Media Department. Having been founded 12 years ago, the ICCM has established itself as one of the leading post-graduate training organisations in Culture and New Media Management with a special focus on creative industries and memory institutions. In addition to programs leading to a Master for Applied Sciences, the ICCM is running research and consulting activities in a broad network of European institutions.

3. FZI - Forschungszentrum Informatik an der Universität Karlsruhe

FZI is a non-profit research center, which belongs to the federal state of Baden-Württemberg in Germany. FZI is unique in its structure since FZI has 12 departments, which are headed by professors from the University of Karlsruhe, Stuttgart, Tübingen and Munich. These professors act as directors of the departments, but they are employed by the university. FZI has outstanding experience in participating in international projects, eg. EU-IST projects. FZI is an organisation that concentrates its efforts on novel information technologies for providers of investment and consumer products, of production processes and of information services. Although being independent from a legal and financial point of view, FZI is closely connected to the University of Karlsruhe. FZI supports the development of innovative applications on the basis of recent but already proven techniques. The organisation of FZI is unique in that it permits professors from the University of Karlsruhe, Germany, to extend their obligations in academic research in the direction of more market-oriented activities, by providing a technical and organisational infrastructure that is particularly congenial to establishing close contacts to industry and service organisations. Most important, FZI offers its members a unique interdisciplinary environment that fosters joint research among diverse fields of Computer Science, Mechanical and Electrical Engineering. Currently, professors from all three faculties co-operate closely under the roof of FZI. The following figure illustrates how FZI achieves its objective as a technology transfer institution.

FZI is judged a unique model of interdisciplinary technology transfer that has now been operating successfully for 15 years. Today, FZI is close to 100 employees, among them more than 90 young scientists within currently 12 research groups.

FZI is Authorized Java Centre (Sun), member of the World Wide Web Consortium (W3C), and member of the Object Management Group (OMG), the standardization body for the Common Object Request Broker Architecture (CORBA).

The WIM (Knowledge Management) department within FZI was founded in December 2000 by Prof. Dr. R. Studer as partner institute of Institute AIFB at the University of Karlsruhe that has an outstanding competence with respect to research work done in the area of the Semantic Web, e.g. it has developed OntoBroker and is participating in the well-known projects like the EU-IST On-To-Knowledge project that established OIL, and the DARPA-DAML OntoAgents project. The research department WIM has grounded experience in the fields of engineering of ontologies and relational metadata based on state-of-the-art Semantic Web methods, tools and standards. Semantic web technologies are applied within different application fields such as natural language processing and information extraction, information integration, knowledge discovery, knowledge portals for intranet-based knowledge management or distributed virtual organizations.

The research group is involved in many industry-university cooperations, both on a European, national and regional level. Currently, e.g., WIM is participating in the following projects:

- EU-IST funded project Ontologging that deals with knowledge management and multiple ontologies and
- The German ministry bmbf-funded project CONsense that applies ontologies within virtual organizations.
- Several industry-funded project, e.g. like the HR-MORE project that applies ontologies in the area of human resource management, in the specific area of skill management or the KNOWGRID project that deals with the establishment of an ontology-based knowledge grid in the life sciences domain.

FZI-WIM hosts a EU-funded Marie Curie Training Site, Centre of Excellence on Semantic Web technologies.

Participation in the project

FZI's role, as one of the technology providers, is the further development of ontology and metadata technology and its extension to multimedia data. FZI builds on existing work done in related projects, e.g. ontology engineering environments and metadata management tools, and tries to adopt the existing work for multimedia data to bring the Multimedia Semantic Web to its full potential. The development strains will be based on previous research on RDF and DAML+OIL. From the research point of view FZI is interested in means that allow the semi-automatic annotation of multimedia data using existing feature extraction algorithms. FZI is also interested to define new RDF language layers with specific focus on multimedia modeling primitives. FZI will also play a significant role in the test and integration of all BRIDGE system modules.

Curricula Vitae

Prof. Dr. Rudi Studer is the head of the knowledge management research group in AIFB, and founder of the WIM department within FZI. He obtained a Diploma in Computer Science at the University of Stuttgart in 1975. In 1982 he was awarded a Doctor's degree in Mathematics and Computer Science (Dr. rer. nat.) at the University of Stuttgart, and in 1985 he obtained his Habilitation in Computer Science at the University of Stuttgart. From January 1977 to June 1985 he worked as a research scientist at the University of Stuttgart, Institute of Computer Science. From July 1985 to October 1989 he was project leader and manager at IBM Germany, Institute of Knowledge Based Systems. Since November 1989 he has been a full professor in Applied Computer Science, Institut fuer Angewandte Informatik und Formale Beschreibungsverfahren (AIFB), University of Karlsruhe. Since 1993, he has been the speaker of the Special Interest Group ``Knowledge Management'' of the Gesellschaft für Informatik (GI) in Germany. From April 1994 to July 1994 he was with the Knowledge Systems Laboratory, Stanford University (Prof. Musen), from April 1998 to August 1998 with Stanford's Computer Science Department (Prof. Wiederhold). From October 1994 to September 1996 he was also Dean of the Department of Economics of the University of Karlsruhe. His current research interests include knowledge management, knowledge engineering, intelligent knowledge brokers, and knowledge discovery.

Further information at http://www.aifb.uni-karlsruhe.de/Staff/studer.engl.html

Alexander Maedche is department manager of WIM within FZI since May 2001. He leads the research group at the FZI Research Centre for Information Technologies at the University of Karlsruhe that conducts research on Semantic Web technologies. In 1999 he has received a diploma in industrial engineering, majoring in computer science and operations research, also from the University of Karlsruhe. His diploma thesis on knowledge discovery earned him a best thesis award at the University of Karlsruhe. Alexander Maedche has worked from 1999 to 2001 as a research assistant at the Institute AIFB, University of Karlsruhe. His PhD is about "ontology learning for the Semantic Web". Alexander Maedche's current research interests cover knowledge discovery, ontology and metadata engineering, application of ontologies for the Semantic Web. He has organized several international and national workshops on ontologies and the Semantic Web.

Further information at http://www.fzi.de/wim/people/maedche/maedche.html

4. intelligent views

Intelligent views is specialised on the development of highly qualified products in the growing and forward-looking areas of: knowledge nets, internal knowledge management for companies and knowledge portals.

An essential unique selling proposition of intelligent views' technology is

- the controlled building up of knowledge
- the ability to build up knowledge in line with the customer's specific needs
- the visualisation of knowledge
- the implementation of distributed knowledge management in any sector

Many years of experience in the execution of projects as well as a highly qualified and motivated team have enabled intelligent views to create K-Infinity – a product that copes with all demands modern enterprises make on effective knowledge systems.

History

The intelligent views gmbh has been founded in 1997 as a spin-off enterprise of the Integrated Publication and Information Systems Institute (IPSI) of the GMD – National Research Centre for Information Technology in Darmstadt. During a many years' experience of research co-operation the founders Dr. Thomas Kamps, Jörg Kleinz, Klaus Reichenberger and Lothar Rostek were working intensively on the topic "publication and visualisation environment". The focus of their research work lay on knowledge-based publication systems, automated visualisation processes and page layout.

Computer scientists, germanists, historians, computer linguists, graphic designers, typographs as well as a number of collaborators from other disciplines are working together in an interdisciplinary team which leads to an efficient entirety.

Clients and research partners

DeTe Berkom, Berlin (HAWK project), Springer Verlag (Multibook), Systhema Verlag (Fischer-Weltalmanach), S.Fischer Verlag (Fischer-Weltalmanach and Thomas Mann GKFA), Focus-Online (Netguide), Xipolis.net (xipolis II), Brockhaus (HAWK project), ABB, Mannheim (internal knowledge portal), BIFaB (knowledge network German language), Akadamische Arbeitsgemeinschaft (internal knowledge portal), Zimpel Verlag (internal knowledge portal), City of Frankfurt/Main (internet portal "Topografie der NS-Zeit in Frankfurt am Main")

EU-project participation

HAWK – Knowledge-based open publication model for intelligent media services

HAWK pilots an innovative publication model for custom-tailored, intelligent media services produced for the internet and other media. Partners from the knowledge publishing industry, from information technology research, and from media design are joining their efforts to implement a prototype system that enables integrated access to distributed heterogeneous information resources and the generation of dynamic multiple views on their content. The main goals of the HAWK project are to demonstrate the easibility and benefits of the proposed open knowledge-based publication model through a concrete prototype of an intelligent media service on the Internet. The HAWK model centres on an XML resource bus that connects the resources of the information providers with the user interfaces of the information consumers. A knowledge base of conceptual and stable factual knowledge that formally represents the resources' domain as a well-structured and semantically interconnected network of information objects serves as an integrator. Through the semantically rich network of content objects, which are rendered to the users as a topic map, the heterogeneous information resources may accessed in an integrated way, content may be drawn out and looked at in different views that the users may select. Project Partners: Ernst Klett Verlag, DE, T-Nova, DE, Pira International, UK, intelligent views, DE, Laser Scan, UK, Grupo Anaya, ES, Hyper Studio, CH.

CULTOS – Cultural Units Learning Tools and Services

The CULTOS project aims to re-establish the common European cultural base by developing tools to construct canons "in reverse" – the cultural threads. Starting with contemporary cultural documents (texts, movies, paintings, popular songs, plays, novels, etc.), a European cultural canon will be re-created by moving backwards. The Cultural Units Learning Tools and Services help holders of cultural knowledge to establish links between "texts", images, movies, music, etc. as they are evoked by the later works (intermedia links) to preserve European cultural memory. A group of international experts in European literature and Arts will develop exemplary units of cultural complexes for an anticipated inter-media, intertextual library to be developed later as an independent project.

Project Partners: Tel Aviv University, Israel; University of London, UK; Technische Universität Berlin, Germany; Southampton University, UK; University of Tartu, Estonia; Bridgeman Art Library, UK; Ernst Klett Verlag, Germany; Macmillan Limited, UK; Mercatis, Germany; Open Tec, Greece; Salzburg Research Forschungsgesellschaft, Austria; Technical University of Vienna, Austria; Textec Software, Germany.

Participation in the project

On one hand, I-views will be responsible for the definition of a BRIDGE business plan. On the other hand, I-views will steer the research and development of the BRIDGE project to ensure that the know-how developed within the project will have a high economical impact at international level, and will provide the necessary background for a successful trade-off of the BRIDGE technologies.

Curricula Vitae

Dr. Thomas Kamps. Dr. Kamps received his doctoral degree from the Darmstadt University of Technology in 1997. As a researcher his major expertise was in the field information visualisation and knowledge systems. He is a founder of intelligent views and managing director / CEO.

Klaus Reichenberger. Klaus Reichenberger is one of the founders of intelligent views gmbh and managing director of the department "Knowledge Engineering". The task of the Knowledge Engineering is to analyse the information sources and requirements of the customers, to design ontologies that capture the information and to design interactive, web-based systems that meet the information requirements. Furthermore, the department offers training, consulting and support for the K-Infinity tool suite. From 1992 to 1997, Klaus Reichenberger worked as a researcher at the GMD-IPSI (Integrated Publication and Information Systems Institute at the German National Research Centre for Information Technology; now Fraunhofer Institute) His research interests were in the areas of knowledge representation and intelligent presentation systems, where he worked together with mathematicians and computers scientists on research prototypes for automatic diagram design and automatic screen/page layout. In his work at the GMD-IPSI he was actively involved in a number of projects, among them the RACE EUROPUBLISHING project and designed interfaces for various electronic publication prototypes. He studied graphics design and visual communication at the Academy of Fine Arts in Munich and at the "Hochschule für Gestaltung" in Offenbach. During his studies, he also worked in different projects at the "Institut für Graphische Datenverarbeitung" of the FhG in the fields of computer animation and visualisation.

Dr. Elke Siemon. Dr. Siemon studied and graduated in Computer Science as "Diplom-Informatikerin", TH Darmstadt/Germany, (Diploma thesis: Object Oriented Analysis Methods – Comparison and Case Study.). Graduation as Dr. ing. at TU Darmstadt/Germany in 2001. (PhD thesis: „Über den Entwurf von Benutzungsschnittstellen technischer Anwendungen mit visuellen Spezifikationsmethoden und Werkzeugen – Endbenutzeraspekte, Wiederverwendung durch Entwurfsmuster und Komponenten".) Since 1990 experienced in OO-software development consulting, seminars in software development and application programs, projects in automation and control system applications, user interface tests and consulting in telecommunication systems, database consulting in medical systems. Classes at the university „ Berufsakademie Mannheim" in Object Oriented Software Engineering in 1996. Research Assistant, TU Darmstadt/Germany between 1996 and 2001. EU-Project experience gained through participation in the "CO-LEARN" teleteaching project. Dr. Siemon joined intelligent views gmbh as product manager, technical consultant and project leader in february 2001.

Sabine Stoye. Studies in law, Georg-August Univ. Göttingen/Germany; further education: system analyst; application engineer for electronic prepress systems at Chromos-Chempak, Schwalbach/Taunus, Germany between 1991 and 1992; trainer for desktop publishing at the 'DTP Akademie', Neu-Isenburg/Germany during the following two years; Studies and Master of Arts in Romance linguistics, Johann-Wolfgang-Goethe-Univ., Frankfurt am Main/Germany, collaboration in the project BLL (Bibliography of Linguistic Literature) within the framework of "General and comparative science of languages, general linguistics" as a special collection of the DFG (German Research Council) at the Stadt- und Universitätsbibliothek Frankfurt am Main from 1994 to 2000; co-editor of the annual „Bibliographie der deutschsprachigen Frauenliteratur" since 1996. Mrs. Stoye entered intelligent views gmbh in 2000 as a knowledge engineer, participating in various projects such as Focus-Online (Netguide), Brockhaus-HAWK, BIFaB (knowledge network German language),City of Frankfurt am Main ("Topografie der NS-Zeit"), CULTOS.

Hans Scholz. Studies in computer science and mathematics at TU Darmstadt/Germany, graduation as Dipl.Inform. (Diploma thesis: memory management for COAST, a replication framework) after 5 years. Since 1994 experienced in oo-software design and development, in particular groupware and base technologies for CSCW (Computer Supported Cooperative Work) at the GMD (German National Research Centre for Information Technology; now Fraunhofer Institute). In september 1999, Mr. Scholz joined intelligent views, now working on design and development of knowledge based nets.

5. Albertina

Vienna's Albertina is one of the most important museums in the world. It houses the famous graphic collection of Duke Albert of Saxony-Teschen (hence its name), a son-in-law of the Empress Maria Theresa, as well as an architectural collection and the newly established photo collection.

Dürer's "Hare" and his "Clasped Hands" are two of the most frequently reproduced works in the world: the originals have been owned by the Albertina for centuries. Among the Albertina's 60 000 drawings and 1 million prints, the children's studies of Rubens as well as the masterpieces of Schiele, Cézanne, Klimt, Kokoschka, Picasso and Rauschenberg are among the best-known. The photo collection of the Albertina includes works by Helmut Newton and Lisette Model.

In March 2003, the Albertina, which is housed in Vienna's largest Habsburg residential palais, will be reopened, allowing the unique coexistence of a modern museum and a historic palais to be experienced. The opening exhibition (from mid-March 2003) is devoted to Edvard Munch; a Dürer show will follow in September 2003. The exhibitions will be presented in the newly erected exhibition halls, one of which is embedded in the Bastei (bastion), the former city wall of Vienna. And for the first time, visitors to the Albertina will be also be able to enter the classicistic staterooms of the palais, among them the Hall of the Muses and the Gold Cabinet.

The Albertina is pursuing one of the most promising and innovative projects in the European museum worlds, namely the digitalisation of its entire museum inventory.

Since February 1999, the Albertina has been the first Austrian museum to embark on the project of creating a complete digital inventory of its collection. Currently 60.000 drawings – and thereafter 1 million prints – are photographed using high-resolution digital cameras and then archived in a data bank.

This year the well-known Austrian Collection Fotografis could be acquired as a permanent loan. Thereby it can be guaranteed that this important treasure of classical items of the international and Austrian history of photography will gain new public attention and be embedded in a richer didactic and aesthetic context.

Another project aims at a computer based inventory of photographic resource material on Austria's early photographic history. It is to comprise a full survey of the scientific, artistic and economic aspects of photographs made between 1839-1864 preserved in various private and public collections all over Austria and abroad. The database shall than be accessible from all those places through the Internet.

A check of the Albertina library and prints collection showed substantial holdings of about 500 items of different historical photographs complying among other very precious salt paper views and panoramas of Old Vienna.

As a virtual museum, the Albertina is to be made accessible to a wider public over the Internet. Beyond that, digitalisation is the prerequisite for global communication and data sharing among museums themselves. With the digitalisation project, the Albertina, which already has become a model for numerous other museums, takes on the role of an international leader in this field.

Participation in the project

On the one hand the Albertina will provide some important content for the project. These digitised documents will form the foundation for the annotation corpus. Aside from providing contents and documents sources the Albertina will also be involved in the development and definition of the domain database.

At the other hand the Albertina will be one the main initial users of the BRIDGE environment. Together with other domain experts the Albertina will test the interface and built up the information network.

Curricula Vitae

Mag.Dr. Alfred Weidinger. Dr. Weidinger took his mastership examination as a watchmaker in 1980. Formation for the areas: bookkeeping, commercial law, industrial law, wage offsetting, apprentice teacher

check. 1980-1981 active service duty 1985-1992 study of the history of art and classical archaeology at the University of Salzburg 1992 thesis (diploma) over the landscape-paintings by Gustav Klimt. 1992-1995 free service relation with the Albertina. Since 1992 creation of an Oeuvre catalogue of the drawings and watercolours by Oskar Kokoschka. Since 1994 creation of an Oeuvre catalogue of the paintings Gustav Klimts. 1995-2000 curator for 20century-art of the Albertina, in this time responsible for numerous exhibition projects (predominant in the Albertina and the Guggenheim museums New York, Berlin and Bilbao), publication of numerous publications. 1997 thesis over Oskar Kokoschka and his early works. Since 1998 building representative of the bmbwk for the Albertina. Head of all digitization projects of the Albertina. Since 2000 deputy director of the Albertina. 2000 formation as a controller at the Austrian institute for controllers. Since 2001 deputy managing director of the Albertina.

Mag. Michael Ponstingl. Mr. Ponstingl received his MSc in communication science and journalism from the University of Salzburg in 1992. Since 2000 he works as a research assistant at the Albertina. His research interest cover databases for the art.

6. KHM – Kunsthistorisches Museum

The collections of the Kunsthistorische Museum are amongst the most important and spectacular in the world. Many of the treasures were assembled by the Habsburgs, for centuries enthusiastic patrons and collectors. The Museums collections range from Ancient Egyptian and Greek and Roman Antiquities to the Collections of Medieval Art to the splendid Renaissance and Baroque Collections. In all, the museum is divided into 11 different collections, some of which are housed in the Hofburg, in Schönbrunn Palace and in Ambras Castle near Innsbruck. At the beginning of 2001, the Völkerkundemuseum (Ethnological Museum) and the Theatermuseum (Theatre Museum) were incorporated into the Kunsthistorisches Museum. The Museum owns more than 2 millions objects. In the year 2000 the Museum had 1.2 millions visitors. The KHM is organizing 30-40 special exhibitions within a year.

The Bundesmuseen-Gesetz in 1998 (Law on Federal Museums) lays down the basic structure of museums as public institutions, as well as the other prerequisites for museums as independent institutions. The charter (Museumsordnung) must be mentioned in this context. Here, the museums were able to formulate their own ideas and aims, but which are now binding and to which they have to adhere. Here, each of the five federal museums granted autonomy so far, was able to formulate its own mission-statement to conduct scholarly research and to collect. These guidelines have passed into law so that a manager has little choice but to refrain from running his museum on purely commercial principles, or from only putting on special exhibitions or from ignoring research. In conjunction with the Law on Federal Museums, the charter offers the museum the chance to actually enact programmes that are in the interest of the museums and which are devoid of commercialising tendencies.

On 1.1.1999, the Kunsthistorisches Museum was the first to be granted autonomy. First, it had a charter, then statutes for the manager, and finally statutes for the Kuratorium. Then the Federal Ministry had to appoint the nine members of the Kuratorium: five representatives of the Ministry, two representatives of the staff, one scholar, and one representative of the „Friends„ Association or from the public sphere unconnected with the museum. The Kuratorium meets four times a year; it is solely a financial supervisory board, which can accept or reject the budget. It also has the power and the duty to point out legal transgressions of the director or manager and to punish them. But it does not have the power to intervene in the conceptual work of the museum. This means that the management, that is the director, is free in his decisions regarding museum work, and can only be corrected by the Kuratorium in budgetary matters. The museum has no longer public administrative accounting and this is a great advantage; instead, it has private-sector bookkeeping and accountancy, that are much less restrictive. Decisions such as whether a certain sum of money should be used for the appointment of a new member of staff or for an acquisition are now solely the museum‘s responsibility.

About financing: its foundation is the so-called basic-funding, as laid down in the Law on Federal Museums It totals 920 million ATS and is distributed according to a fixed ratio among the different institutions. It is based on the figures for 1997 that may be considered average. These sums were turned into percentages that will remain unchanged in future. For example, the Kunsthistorisches Museum receives 278 million ATS annually. These sums are guaranteed by law and cannot be reduced. This basic-funding needs to be augmented by additional income. At present, the total budget of a museum is made up of the so-called basic-funding and other income. These are entrance fees, profits from shops, renting out the museum, leasing, donations , sponsoring etc. Basic-funding guarantees the survival of a museum to a certain extent even if it attracts less visitors. The annual basic funding cannot be changed, neither increased nor decreased. It is not linked to inflation and is not raised to accommodate rising personnel or maintenance costs, and that is the greatest difficulty.

Research projects and cooperation partners

The Kunsthistorisches Museum has recently started a project to digitize the department of European Paintings using the museum software TMS (The Museum System), a database developed by gallery system in cooperation with important international Museums and Institutions as The Metropolitan Museum New York and the Getty Foundation. The Albertina also works with this software which guarantees international standards.

Kunsthistorisches Museum in Vienna cooperates with the Guggenheim Foundation in New York and the State Hermitage in St. Petersburg. Ths cooperation is the first collaborative enterprise ever to be undertaken in the international history of museums by three of the most outstanding museums in the world. The three partners venues include currently St. Petersburg, Vienna, Innsbruck, New York, Venice, Bilbao, Berlin, Amsterdam, London.

Along with this cooperation the Kunsthistorisches Museum has become a partner of ‚guggenheim.com', a new online destination for the visual and performing arts, due to launch in Fall 2001. Guggenheim.com will be collaboration of the Solomon R. Guggenheim Foundations, The State Hermitage Museum in St. Petersburg, the Kunsthistorisches Museum in Vienna, the Albertina in Vienna, and the Zentrum für Kunst und Medientechnologie in Karlsruhe, Germany.

The Kunsthistorisches Museum takes part in the project ‚EuroMuse', an Internet portal developed by a network of European art museums. (The National Gallery London; Le Louvre Paris; La Réunion des Musées Nationaux Paris; the Kunsthistorisches Museum Wien; Rijksmuseum Amsterdam; Statens Museum for Kunst Kobenhavn and the Staatliche Museen zu Berlin.) This portal is designed to provide the general public with direct access to information about the exhibitions and activities available from the participating museums and will launch by the beginning of october. (www.euromuse.net)

Participation in the project

On the one hand the Kunsthistorisches Museum will provide some important content for the project. These digitised documents will form the foundation for the annotation corpus. Aside from providing contents and documents sources the Kunsthistorisches Museum will also be involved in the development and definition of the domain database.

At the other hand the Kunsthistorisches Museum will be one the main initial users of the BRIDGE environment. Together with other domain experts the Kunsthistorisches Museum will test the interface and built up the information network.

Curricula Vitae

DR Franz Pichorner. Dr. Pichomer received his doctoral degree from Vienna University: Department of History in 1988. He then participated in the joint Austro-Belgian research project: "Belgium and Austria in the Eighteenth Century", under the direction of Prof. Elisabeth Kovács. From 1991 – 95 he was research assistant in the historical research project, "Rescue or Fall of the Habsburg Monarchy, Political Documents on Emperor Charles from International Archives". At that time he also served as lecturer at the department of History at Innsbruck University. He then became member of staff at Vienna liaison office of Dr. Franz Fischler, Commissioner of the European Union. Since 1998 he is assistant to Dr. Wilfried Seipel, Director General of Kunsthistorisches Museum, Vienna.

DR. Gerlinde Gruber. Dr. Gruber received her Dr. Phil. From the Art History department of the University of Vienna in 1997. Then she served in a post-doctorial-followship of the Fondazione di storia dell´arte Roberto Longhi in Florence. From 1999 – 2001 she worked at the Graphische Sammlung Albertina as database administrator. Her current position is in the Kunsthistorisches Museum, Vienna, where she manages the organisation and application of the database for the Gemäldegalerie. Her research interests cover Italian Baroque Painting; Baroque Genre Painting. Dr. Gruber has published different papers and catalogue entries in international journals and expositions.

Mag. Esther Schlicht. Mrs Schlicht received her Master of Philosophy (Mag. Phil) in Art History & Media Theory, Philophy, Media Arts, from the Hochschule für Gestaltung Karlsruhe, Germany, in the year 2000. Since April 2000 she is employed by the Kunsthistorisches Museums Vienna, as head of the Internet-Department. She gained experiences with the conceptual and catalogue work for the exhibition „Fische, Flieger, Frau im Winter" in the Badischer Kunstverein Karlsruhe, Germany, 2000. Moreover, she realized between 1993 and 2000 several documentary films. She also worked as a free lancer for the ZKM Karlsruhe / Center for Art and Media, Karlsruhe, Germany, 1997-2000.

C8. Economic development and scientific and technological prospects

The BRIDGE project will produce a working prototype for a dynamic WWW-based publishing environment that provides user-friendly interfaces to support domain specialists in establishing complex information spaces, which can be immediately accessed by colleagues and the general public via intelligent dynamic user interfaces. The first targeted application domain is film theory, history, and anthropology, but the tools and the system architecture developed within the project will be of particular interest for all kind of organisations publishing complex information spaces with the need for instant information exchange and the use of different media as means for information presentation.

The two content providers and pilot users participating in the BRIDGE project (Albertina and Kunsthistorisches Museum) are mainly interested in exploiting the BRIDGE technology from an application point of view, in order to better accomplish their work and make the artefacts in the archives available to the general public. The technology providers (CWI, Vienna University, and FZI) are very interested in academic exploitation and dissemination in the form of conference papers and other publications as well as for university-level teaching, but also in reuse of the technologies – software, interfaces, etc. – for other projects and products.

The commercial oriented partner in BRIDGE (I-Views) will market the BRIDGE results, i.e. the concept, content and technology developed in BRIDGE.

As part of the general BRIDGE dissemination strategy we plan to conduct a number of *workshops* on interim results, BRIDGE will also be present in Internet through the maintenance of an up-to-date project Website on current developments. Both the workshop and the Internet appearance are described in the appropriate work package descriptions in Part B.

In the following we describe the BRIDGE consortium's threefold strategy for exploitation and dissemination: 1) dissemination of the information space concept through the content providers/pilot users, 2) academic exploitation through the research-oriented technology providers, and 3) commercial and/or research project-oriented reuse of developed software technology and concepts.

Exploitation strategy of the consortium

Dissemination of the information space concept through the content providers/pilot users

The exploitation efforts of the two content suppliers and users in the BRIDGE consortium will concentrate on academics, on winning contributors for the planned application itself, and on the general public. In particular, the following activities are planned:

- In a cooperative effort with universities and other institutes the consortium will provide information about the BRIDGE publishing/presentation environment, with the goal to include students of the fine arts in the editioning work.
- In addition to activities within directly related academic fields, the classical online community will be utilized to make results known and to win collaborators. This could include H-Net (Humanities and Social Sciences Online, http://www.h-net.msu.edu) and its German subsidiary H-Soz-u-Kult (Humanities, Sozyil- und Kulturgeschichte, http://hsozkult.geschichte.hu-berlin.de).
- The production of two electronic fine art related knowledge space pilots is planned in order to make results available to the interested public. It is assumed by all partners that the created information spaces will represent the start point of emerging information environments in the form of advanced Web information services. Thus we immediately create an attractive and expressive documentation on the content-based project work, which will attrack future interest through continious improvement.

Academic exploitation through the research-oriented technology providers

CWI, University of Vienna, and FZI, as primarily research-oriented members of the consortium, will exploit the results of BRIDGE in the following ways:

- Two workshops will be held at which scholars in related fields will be invited to review the interim results and give their critical appraisal. Results of the workshops will be published.
- Papers will be submitted to appropriate conferences and workshops in the field. Possible candidates include: international Digital Library conferences such as ECDL, IEEE ADL and ACM DL; international human-computer interaction conferences such as CHI and INTERACT; the SIGIR, the most important conference on information retrieval; conferences in the fields of multimedia and artificial intelligence, such as ACM Multimedia, ICME, ECAI, and IJCAI. Articles will also be submitted to professional journals in the relevant fields of endeavor.
- As each of the three research partners is either a university itself or maintains close ties to universitites, seminars and lectures on the themes of BRIDGE will be conducted, possibly resulting in thesis work by students.

Commercial and research project-oriented reuse of BRIDGE software technology and concepts

The consortium identified at the moment of writing three key areas of exploitation:

1. **Electronic information spaces for fine arts**: Museums and other cultural organisations -- participating in the project or not -- but in any case directly sharing the fine arts ontology developed in the project.
2. **Ontology enhanced web portals** / information spaces for institutions and companies with large amounts of multimedia assets, e.g. image libraries, vendors of music or films, auction houses, online or offline. Potential customers in this area would share the application/technology, but not the data/knowledge.
3. Business generated through the **participation in shaping the semantic web** offered by the BRIDGE-project

Concerning exploitation of the developed software technology and service business model, the scenario in BRIDGE is individual exploitation. Each partner is aware that this individual exploitation does not mean exclusive exploitation of results. For achieving this, the consortium will prepare a **patent and intellectual property rights agreement** that will take into account all possible situations if one or more partners make an invention during the BRIDGE project.

Concrete steps will be:

- The needs of users will be analyzed in WP2 and WP3, and these needs will contribute to the formulation of the general system specifications.
- An assessment of how the BRIDGE tools measure up to the users needs will be made twice during the project, as described in WP 8.
- The BRIDGE consortium's **commercial strategy** for exploiting the project results, and its positioning in the market will be assessed and planned over the complete project time by the major contributor I-views, supported by Albertina and Kunsthistorische Museum. Some questions to be addressed during this process are:
    - Which business will be established:
        a) middleware provider: maintaining the server and tools, offering this service to the content providers (e.g. museums) who establish the information space (via experts).
        b) information space provider: using tools and server technology for providing information spaces (I-view only)
        c) a mix between a and b.
        d) a mere technology provider

- Wich access model will be applied, i.e.who will be provided with the expert tools for influencing the information space? How does the system react on links set from other web pages?
- Which monitary schem will be applied to a fully comercial system: subscription, item-based or advertisement-based, or a mix? How do the socio-contributions fit in here? What about micropayment (research is necessary to understand if the major creditcard company can and will cope with that)?
- Which monitary distribution schem for content contributors/service providers will be used: a general percentage schem or payment based on actual traversed nodes and links? What about everyday users who suggested a link/relation/annotation or provided material, which is eventually included by the experts?
- What about IPR – not only on the basis of material but also with respect of securety with regards to own contributions (e.g. important if experts will use their contributions in electronic information spaces as valuable references to their work)?

Thus, the commercial strategy will build up during the project and the consortium will prepare a ***business plan*** (a merge of the Final Project Report (PR) and the final but extended Evaluation Report) to establish the steps for creating a joint venture which will market BRIDGE (WP9).

Individual dissemination and exploitation plans

CWI

As the National Research Centre for Information Technology and related fields in the Netherlands **CWI** is first and foremost involved with applied and basic research in information technology. As the national research centre, CWI cultivates its relations to institutions of higher education, government agencies, and industry, and considers the transfer of research results as the highest priority. Besides this information transfer on a national level, CWI intends to present the results of the project to the international scientific community, i.e. at international conferences and workshops and in form of journal publications.

CWI is a member of the "*European Consortium of Informatics and Mathematics" (ERCIM)*, which has partners in 13 European countries, including Scandinavia and Central/Eastern Europe. Most are independent Research and Development laboratories, with strong links to local industry. ERCIM partners have generated over 100 spin-off companies and do joint developments with SMEs. CWI can use its ERCIM connections to establish exploitation paths in those countries not directly covered by the BRIDGE project partners.. Moreover, CWI itself provides a company, i.e.the CWI Incubator, which allows to gather chares from founded ***spin-off companies***,thus providing all CWI employees to participate in the gained results on an economic level

Vienna University

Vienna University is one of the most prestigious universities in Austria with an active research community. The research scope of the university includes applied and basic research in information technology, software systems, and communication technology. The University has close ties to other national and international universities, government agencies, and industry, and regards the transfer of research results as a high priority. We will exploit this burgeoning research community to further advance the remits of the project.

In addition, Vienna University has exploitation goals directly related to its mission as a research institution. The main line of interest is the exploitation of scientific and conceptual results developed in BRIDGE. For this purpose Vienna University follows two main channels. In the scientific community we plan to present the results of this project at several international conferences and workshops. In addition to this, the work in BRIDGE will lead to journal publications and contribute to Ph.D. theses. Furthermore, the results will also be exploited in lectures, seminars, and thesis supervision which will help familiarize students with new techniques in the areas of adaptive animated interfaces, semantic web technology, and user modelling.

As a university, we do not have a mission to make profits. As such, Vienna University is not interested in marketing products or continued support. However, we have a mandate to patent, sell licences, sell software rights, etc. as part of the University's technology transfer programme.

FZI

As mentioned earlier FZI is an organisation that concentrates its efforts on novel information technologies for providers of investment and consumer products, of production processes and of information services. FZI as a research center has a specific focus on knowledge transfer and dissemination. It's mission is to accompany companies throughout the process of integrating innovative solutions in information technology into your organisation and products. Thus, FZI task is to transfer the technology of tomorrow to overcome your problems of today.

FZI is also active in the Semantic Web research area strongly cooperating with Institute AIFB, University of Karlsruhe. Besides the knowledge transfer to companies on a regional and national level, FZI will present the results of BRIDGE to the international Semantic Web community, i.e. at international conferences like SWWS, WWW, IJCAI, etc. and workshops. FZI-WIM has already organized several workshops on Ontologies and related topics at international conferences. It is also planned to organize scientific workshops with respect to BRIDGE relevant research topics.

I-Views

Intelligent views sees four areas of exploitation, three of them are following the general exploitation strands of the project, one particular area is mainly relevant for intelligent views:

1) Electronic information spaces for fine arts

The realisation of this exploitation opportunity depends on the success of the information space and ontology developed by BRIDGE in the world of the fine arts. The project will aim to establish the BRIDGE paradigm as an ideal way for cultural institutions of structuring, accessing and sharing art information. The BRIDGE concept is sufficiently powerful and open to allow a direct integration of additional players, their content and their structures. Most likely, a product in this area will be a package including the concept, content and technology. It will be exploited together with the BRIDGE application partners; together with them, a business model for the participation of further cultural institutions will be developed.

2) Ontology enhanced web portals with large amounts of multimedia assets

In this area, intelligent views will benefit from the BRIDGE-project in having a reference installation with two well known institutions and some expertise with new business models for the customers, regarding web-based exploitation of multimedia assets and content syndication. Technically, large parts of the solutions will be implemented – at least as advanced prototypes. The product will probably be a specialised, "vertical" solution – potential customers are all companies and institution who can benefit from the application and technology but will use a different ontology. For this, area, intelligent views will write a Business plan for this product / market segment, assessing market size, analysing the competitive landscape and planning the sales effort.

3) Enhancements of K-Infinity

Possible enhancements of K-Infinity include the multimedia annotation and presentation tools, user profiling and techniques for the sharing and interchange of different ontologies. These will be marketed by intelligent views based on agreements with the research partners in BRIDGE as modules of the K-Infinity system. Intelligent views will evaluate all technological components that are developed in the BRIDGE project, whether they complement the K-Infinity platform. For all relevant components there will be a module development plan and pricing model.

4) Participation in shaping the semantic web

Building an early semantic web application with the possibility to influence or at least be continuously informed about the development of the semantic web and relevant standards might as well bear the highest exploitation potential of the BRIDGE project for intelligent views. However, only the project itself will show how big the BRIDGE contribution can be in the semantic web area and which impacts semantic web

standards will have for intelligent views' business. An assessment of these questions will be part of the first evaluation phase.

Albertina

The exploitation should be viewed at two levels: information provision and commercial exploitation. For the Albertina the project provides the means to investigate advanced issues in AV content representation and management. With this project the Albertina can strengthen its position as a world-class provider of art artefacts and related information. BRIDGE thus provides us with technical solutions to cope with a dynamically evolving World Wide Semantic Web.

As the Albertina is involved in the educational program at Vienna University, we will include students of art and art history in the development of BRIDGE, in form of lectures, seminars, and so forth. In addition to activities within directly related academic fields, the classical online community (H-ARTHIST list (http://www.h-net.msu.edu/) or the Museums Professionals Mailing List (http://www.hclist.de/) will be exploited to make results known and to win partners.

Economic exploitation will be granted by detailed description on the Albertina Webpage, including the Albertina BRIDGE publication pilot, and participation in the Exploitation Board.

Kunsthistorisches Museum

The exploitation strategy of KHM includes and focuses on three aspects: information, cooperation and commercial exploitation. Only by informing the professionals will be ensured that the cooperation between domain experts and other users will succeed.

In a cooperative effort with universities and other institutes, project seminars will be conducted on the subject of the information space. The goal is to include students of art and art history in the editing work. In addition to activities within directly related academic fields, the classical online community will be utilized to make results known and to win collaborators. This could include e.g. H-ARTHIST list (http://www.h-net.msu.edu/) or Museums Professionals Mailing List (http://www.hclist.de/).

Through contacts like these we will introduce the project to the professionals. Economic exploitation will be granted by detailed description on the KHM Webpage, including a BRIDGE publication pilot, and participation in the Exploitation Board.

C9. ANNEX – Relevant publications by project participants

[1] Boll, S., Heinlein, C., Klas, W., & Menth, M. (2001). *MPEG-L/MRP: Implementing adaptive Streaming of MPEG Videos for Interactive Internet Applications.* Proceedings of the 9th ACM Multimedia Conference. Ottawa, Canada, Sept. 2001

[2] Boll, S. & Klas, W. (2001). *ZYX - A Multimedia Document Model for Reuse and Adaptation* Transactions on Knowledge and Data Engineering, DS-8 Special Issue IEEE, May/June 2001

[3] Boll, S., Heinlein, C., Klas, W., &, Wandel, J. (2000). *MPEG-L/MRP: Adaptive Streaming of MPEG Videos for Interactive Internet Applications* Advances in Multimedia Information Systems - Proceedings of the 6th International Workshop on Multimedia Information Systems (MIS'00), Chicago, USA, October, 2000

[4] Boll, S., Klas, W. & Westermann, U. (2000). *Multimedia Document Formats - Sealed Fate or Setting Out for New Shores?* Multimedia - Tools and Applications, Volume 3, Number 2, Kluwer Academic Publishers. Dordrecht, The Netherlands, 2000

[5] Boll, S., Klas, W. & Westermann, U. (1999). *Multimedia Document Formats - Sealed Fate or Setting Out for New Shores?* IEEE International Conference on Multimedia Computing and Systems (ICMCS 99) Florence, Italy, 7.-11. June 1999

[6] Boll, S.., Klas, W., &, Wandel, J. (1999). *A Cross-Media Adaptation Strategy for Multimedia Presentation* In Proceedings of the ACM Multimedia'99, Orlando, Florida, USA, 30. Oct. - 5. Nov. 1999

[7] Boll, S., Klas, W. & Westermann, U. (1999). *Exploiting OR-DBMS Technology to Implement the ZYX Data Model for Multimedia Documents and Presentations* GI-Fachtagung Datenbanksysteme in Büro, Technik und Wissenschaft (BTW), Freiburg, 1.-3. März 1999

[8] Boll, S., Klas, W., & Löhr, M. (1996).Integrated Database Services for Multimedia Presentations Multimedia Information Storage and Management, S.M. Chung (ed.) Kluwer Academic Publishers. Dordrecht, The Netherlands, 1996

[9] Boll, S. & Löhr, M.(1996). Interactive Multimedia Presentation Capabilities for an Object-Oriented DBMS ERCIM Workshop Reports, 9th ERCIM Database Research Group Workshop on Multimedia Database Systems. Darmstadt, Germany, March, 1996

[10] Decker, D., Erdmann, M., Fensel, D., and Studer, R.: Ontobroker: Ontology Based Access to Distributed and Semi-Structured Information. In: R. Meersman et al. (eds.), Database Semantics: Semantic Issues in Multimedia Conference on Database Semantics (DS-8), Rotorua, New Zealand, Kluwer Academic Publishers, Boston, 1999.

[11] Erdmann, M., Maedche, A., Schnurr, H.-P., Staab, S.: From Manual to Semi-Automatic Semantic Annotation: About Ontology-based Text Annotation Tools. ETAI – Semantic Web Journal, Linkoeping Electronic Articles, 16(1), 2001

[12] Fensel D., Van Harmelen, F., Decker, S., Erdmann, M., & Klein, M. (2000). OIL in a Nutshell, Knowledge Acquisition, Modeling, and Management, In Proceedings of the European Knowledge Acquisition Conference - EKAW-2000, pp. 1-16, Lecture Notes in Artificial Intelligence, LNAI,Springer-Verlag

[13] Handschuh, S., Maedche, A,. & Staab, S. (2001). CREAM --- Creating relational metadata with a component-based ontology driven framework. Proceedings of the First ACM-Conference on Knowledge Capture, K-CAP'01, Victoria, Canada, October, 2001.

[14] Hardman, L., van Ossenbruggen, J., Rutledge L., & Bulterman, D.C.A (1999) Hypermedia: The Link with Time In: ACM Computing Surveys, December 1999

[15] Hotho, A., Maedche, A., Staab, S., Studer, R.: SEAL-II – The soft spot between richly structured and unstructured knowledge. to appear in: Journal of Universal Computation Science, 2001.

[16] Maedche, A. and Staab, S.: Ontology Learning for the Semantic Web, IEEE Intelligent Systems (Special Issue on the Semantic Web), 16(2), 2001

[17] Maedche, A, Staab, S., Stojanovic, N., Studer, R., & Sure, Y.: Semantic PortAL – The SEAL approach. to appear: In Creating the Semantic Web. D. Fensel, J. Hendler, H. Lieberman, W. Wahlster (eds.) MIT Press, MA, Cambridge, 2001.

[18] A. Maedche and G. Neumann & S. Staab (2001). Bootstrapping an Ontology-Based Information Extraction System. Intelligent Exploration of the Web, Series "Studies in Fuzziness and Soft Computing", Springer}, edited by J. Kacprzyk},

[19] Nack F. and Putz, W (2001) Designing Annotation Before It's Needed. . Proceedings of the 9th ACM Multimedia Conference. Ottawa, pp. 251 – 260, Canada, Sept. 2001.

[20] Nack F. (2000) All content counts - the future in digital media computing is meta. IEEE MultiMedia - July - September 2000, pp. 10-13. IEEE Computer Society.

[21] Nack F. (2000) About the influence of computer semiotics on communal Intelligence. Workshop on Computational Semiotics for New Media, 29-30 June 2000, University of Surrey, Guildford, Surrey, UK

[22] Nack, F. and Lindley, C. (2000) Production and maintenance environments for interactive audio-visual stories. to appear in ACM MM 2000 WS proceedings - Bridging the Gap: Bringing Together New Media Artists and Multimedia Technologists, October 31, 2000 Los Angeles, CA.

[23] Nack, F. and Lindsay, A. (1999) Everything you wanted to know about MPEG-7: Part I and II. IEEE MultiMedia, July – September 1999,pp. 65 – 77, October - December 1999,pp.64-73, IEEE Computer Society.

[24] Nack, F. (1996). AUTEUR: The Application of Video Semantics and Theme Representation in Automated Video Editing," Ph.D., Lancaster University, 1996.

[25] Rutledge, L., Davis, J., van Ossenbruggen, J., & Hardman L. (2000). Inter-dimensional Hypermedia Communicative Devices for Rhetorical Structure In: Proceedings of International Conference on Multimedia Modeling 2000 (MMM00), November 13-15, 2000, Nagano, Japan

[26] Rutledge,L., Bailey,B., van Ossenbruggen, J., Hardman ,L., & Geurts, J. (2000). Generating Presentation Constraints from Rhetorical Structure In: Proceedings of the 11th ACM conference on Hypertext and Hypermedia (pages 19-28), May 30 -- June 3, 2000, San Antonio, Texas, USA,

[27] Rutledge, L., van Ossenbruggen, J., Hardman L. & Bulterman, D.C.A. (1999). Mix'n'Match: Exchangeable Modules of Hypermedia Style In: Proceedings of the 10th ACM conference on Hypertext and Hypermedia (pages 179-188), February 21-25, 1999, Darmstadt, Germany,

[28] Staab, S., Angele, J., Decker, S., Erdmann, M., Hotho, A., Maedche, A., Schnurr, H.-P., Studer, R., Sure, Y.: Semantic Community Web Portals. In: Computer Networks (Special Issue: WWW9 - Proceedings of the 9th International World Wide Web Conference, Amsterdam, The Netherlands, May, 15-19, 2000), Elsevier.

[29] Staab, S. and Maedche, A.: Knowledge Portals - Ontologies at Work. AI Magazine 21(2), Summer 2001.

[30] Staab, S., Erdmann, M., Maedche, A.: Ontologies in RDF(S). to appear in: ETAI – Semantic Web Journal, Linkoeping Electronic Articles, 2001.

[31] Stumme, G. and Maedche, A.: FCA-Merge – Bottom-Up Merging of Ontologies. In IJCAI-2001 – Proceedings of the 17th International Joint Conference on Artificial Intelligence, Seattle, USA, August, 1-6, 2001, San Francisco. Morgen Kaufmann.

[32] de Vries, A.P., Windhouwer,M.A., Apers,P.M.G., & Kersten, M.L. (2000). Information Access in Multimedia Databases based on Feature Models. CWI Internal Report, January 2000

[33] Westermann, U. & Klas, W. (1999). *Architecture of a DataBlade Module for the Integrated Management of Multimedia Asset.* First International Workshop on Multimedia Intelligent Storage and Retrieval Management (MISRM) Orlando, Florida, Oktober 1999

[34] Windhouwer, M.A., Schmidt,R.A. & Kersten, M.L. (1999).. Acoi: A System for Indexing Multimedia Objects. In International Workshop on Information Integration and Web-based Applications & Services, Yogyakarta, Indonesia, November 1999.