SIXTH FRAMEWORK PROGRAMME

PRIORITY IST-2002-2.3.1.12

Technology-enhanced Learning and Access to Cultural Heritage

Contract for:

NETWORK OF EXCELLENCE

Annex 1 - "Description of Work"

Network acronym: **DELOS**

Network full title: DELOS: a Network of Excellence on Digital Libraries

Proposal/Contract no.: **G038-507618**

Related to other Contract no.: IST-1999-12262

Date of preparation of Annex 1: **01 December 2003 (FINAL)**

Operative commencement date of contract: **01 January 2004**

1 Contractor list

List of Participants

CO = Coordinator; CR = Contractor

Role	N.	Participant legal name	Short name	Country	Enter	Exit
CO	1	GEIE-ERCIM	ERCIM	France	1	48
CO	2	Consiglio Nazionale delle Ricerche	CNR-ISTI	Italy	1	48
CR	3	Eidgenoessische Technische Hochschule Zurich	ETH Zurich	Switzerland	1	48
CR	4	University of Bath	UKOLN	UK	1	48
CR	5	National and Capodistrian University of Athens	UOA	Greece	1	48
CR	6	Technical University of Crete	TUC	Greece	1	48
CR	7	Università degli Studi di Firenze	UNIFI-MICC	Italy	1	48
CR	8	Fraunhofer-Gesellschaft zur Förderung der Angewandten Forschung	FHG/IPSI	Germany	1	48
CR	9	University of Glasgow	GU	UK	1	48
CR	10	Universität Duisburg-Essen	UNIDU	Germany	1	48
CR	11	Stichting Centrum voor Wiskunde en Informatica	CWI	Netherlands	1	48
CR	12	Risoe National Library	RISOE.DK	Danemark	1	48
CR	13	Foundation for Research and Technology – Hellas	FORTH	Greece	1	48
CR	14	Università degli Studi di Roma “La Sapienza”	ROMA1	Italy	1	48
CR	15	Brunel University	UBRUN	UK	1	48
CR	16	Institute of Communication and Computer Systems	ICCS	Greece	1	48
CR	17	Università degli Studi di Padova	UNIPD	Italy	1	48
CR	18	Università degli Studi di Milano	UNIMI	Italy	1	48
CR	19	Institut fuer Medizinische Informatik und Technik Tyrol	UMIT	Austria	1	48
CR	20	Max-Planck-Gesellschaft z.F.d.W. represented by: MPI fuer Informatik	MPII	Germany	1	48
CR	21	Kuratorium OFFIS E.V.	OFFIS	Germany	1	48

Role	N.	Participant legal name	Short name	Country	Enter	Exit
CR	22	Queen Mary & Westfield College, University of London	QMUL	UK	1	48
CR	23	University of Strathclyde	USG	UK	1	48
CR	24	Ionian University, Archive and Library Science Department	IU	Greece	1	48
CR	25	Université Paris-sud XI	UPSXI	France	1	48
CR	26	The University of Southampton	UOS	UK	1	48
CR	27	The University of Edinburgh	UEDIN	UK	1	48
CR	28	Institut fuer Informationsverarbeitung und Computergestuetze Neue Medien	IICM	Austria	1	48
CR	29	Technische Universität Wien	TUW	Austria	1	48
CR	30	Universita' degli Studi di Urbino Carlo Bo	UNIURB	Italy	1	48
CR	31	Norges Teknisk-Naturvitenskapelige Universitet NTNU	NTNU	Norway	1	48
CR	32	Lunds Universität	ULUND	Sweden	1	48
CR	33	Institut National de Recherche en Informatique et en Automatique	INRIA	France	1	48
CR	34	Aristotle University of Thessalonikis	AUTH	Greece	1	48
CR	35	Nationaal Archief	NANETH	Netherlands	1	48
CR	36	Univesitaet Bremen	TZI	Switzerland	1	48
CR	37	Österreichischen Akademie der Wissenschaften	OEAW	Austria	1	48
CR	38	University of Leeds	UNIVLEEDS	UK	1	48
CR	39	Universität zu Köln	UCO	Germany	1	48
CR	40	Forma (Centro di) Formazione e Ricerche per Metodologie Applicate alla Conservazione, Gestione e Comunicazione di Beni Culturali	CF	Italy	1	48
CR	41	SICS, Swedish Institute of Computer Science AB	SICS	Sweden	1	48
CR	42	Universita' di Modena e Reggio Emilia	UNIMORE	Italy	1	48
CR	43	Masarykova Universita v Brne	MUNI	Czech Republic	1	48
CR	44	Universiteit van Amsterdam	UVA	Netherlands	1	48

Role	N.	Participant legal name	Short name	Country	Enter	Exit
CR	45	Universita' della Svizzera Italiana	UNISI	Switzerland	1	48
CR	46	Magyar Tudomanyos Akademia Szamitastechnikai es Automatizalasi Kutatointezet	MTA SZTAKI	Hungary	1	48
CR	47	Univerisita' degli Studi di Bari – Dipartimento di Informatica	UNIBA	Italy	1	48

1.1 Description of Network Participants

The DELOS partners show a well documented expertise and influence in their research areas as well as engagement to the DL field. Their diverse expertise covers the issues that are most relevant for the DL sector.

Member 1 – ERCIM (FR) Bruno Le Dantec (Administrative Coordinator)	GEIE-ERCIM, the European Research Consortium for Informatics and Mathematics, is dedicated to the advancement of European research and development in information technology and applied mathematics. Its national member institutions aim to foster collaborative work within the European research community and to increase cooperation with European industry. ERCIM has had considerable experience in the management of R&D projects under FP5
Member 2 – CNR-ISTI (IT) Dr. Costantino Thanos (Scientific Coordinator)	CNR-ISTI has carried out research in the digital library domain since 1996. This research has been conducted mainly within the framework of European and nationally funded projects including DELOS under FP5, ECHO, Scholnet, Cyclades, CLEF, and OAF. With the exception of OAF, CNR-ISTI is responsible for the scientific coordination of all these projects. These projects have stimulated numerous research and experimental activities. Current work includes: i) the derivation of algorithms for evaluating queries expressed in the terms of different ontologies, including queries drawn from more than one ontology; ii) the design of open, scalable, and distributed architectures to support the inherently ever-expanding nature of digital libraries; iii) the definition of techniques supporting content-based access to multimedia digital libraries (e.g., audio-visual or image content), iv) methodologies for the evaluation of multilingual information retrieval systems. CNR-ISTI will also represent the CLEF consortium in the NoE. This consortium studies and develops infrastructures for the evaluation of multilingual information retrieval systems. Members are: Eurospider Information Technology (CH), Lenguajes y Sistemas Informáticos – Univ. Nacional de Educaciòn a Distancia, Madrid (ES), Informationszentrum Sozialwissenschaften - Bonn (DE), Evaluations and Language resources Distribution Agency (FR), Department of Information Studies – Univ. of Tampere (FI), Centro per la Ricerca Scientifica e Tecnologica - Istituto Trentino di Cultura (IT), Univ. of Twente - Centre for Telematics and Information Technology (NL), Human Computer Interaction and Language Engineering Lab.- SICS (SV).
Member 3 – ETH Zürich (CH) Prof. H.J. Schek	Work at the Database Research Group (DBS) of ETH Zürich is focused on realizing the hyperdatabase infrastructure vision that combines and generalizes database technology with elements from the grid infrastructure and includes peer-to-peer data management. This infrastructure provides well- established

	database mechanisms at the level of services in a highly distributed, mobile, and autonomous network of information providers and consumers, the "information space" as it occurs in next generation digital libraries. Within this vision, four main research directions are followed: 1) transactional coordination of composite systems, 2) parallelization through the deployment of clusters of databases, 3) information dynamics and mobility, and 4) multimedia information management and efficient search techniques. In addition to theoretical investigations within these directions, the DBS group has a strong tradition in developing prototype systems that demonstrate the usefulness and efficiency of the proposed methods.
Member 4 – UKOLN (UK) Dr. Liz Lyon	UKOLN is involved in a variety of digital library research in both UK and EC funded activities. These include technical development and support of the distributed information architecture which is providing digital library resources to UK higher and further education, development of web services in this context and research in the areas of semantic web, metadata schemas and ontologies. UKOLN also has expertise in the areas of digital preservation and Web archiving, Web standards, cross-sectoral description of collections, the development of national and institutional e-print repositories, integration of digital libraries with learning management systems and institutional portals. More recently, UKOLN is collaborating with the Grid/e-Science community through joint workshops with the National e-Science Centre and in projects linking digital library concepts with Grid-enabled applications."
Member 5 – UOA (GR) Prof. Y. Ioannidis	Research activities in the Laboratory for Advanced Information Systems of the University of Athens include three main areas: query processing and optimization over heterogeneous information sources, information search over distributed autonomous information providers, and personalized access to information sources. Information Search Over Distributed Autonomous Information Providers: Information search and query processing in the DL environment is very challenging and raises numerous problems with respect to topics such as algorithms, scale management, speculating on the individual system's behavior, query optimization, etc. All these problems are investigated with the goal of developing a comprehensive approach to the overall issue. Personalized Access to Information Sources: Appropriate user models for representing user preferences over structured and unstructured data in profiles are investigated. Furthermore, methods for integrating such information into a user request in order to personalize its overall behavior and the final results are developed. In each case, user models that take advantage of specific characteristics of data depending on their type are explored. Query Processing/Optimization Over Heterogeneous Information Sources: Several aspects of traditional approaches to information access are compared and languages, algebras, and processing algorithms that support the necessary semantics across such diverse data sources are developed.
Member 6 – TUC (GR) Prof. S. Christodoulakis	TUC/MUSIC is a center of R&D and education in the technological fields of Information Systems and their applications. Research fields include web services systems, databases and knowledge bases, information retrieval, digital libraries, multimedia management systems, digital TV systems, e-Learning, speech processing etc. TUC/MUSIC has participated in many European and

	national Projects, including large basic research projects (like LTR HERMES), large projects for the development of innovative software tools and integrated multimedia systems (like ACTS SICMA) and projects for technology transfer. Current activities include research in audio-visual management systems and digital TV systems (IST-UPTV project). TUC/MUSIC also investigates the efficient integration of Internet digital libraries and services with the digital TV environment, focuses on audio-visual metadata management, semantic indexing of audio-visual content and mechanisms for personalization and information retrieval. Universal access of audio-visual content is another of the research topics of TUC/MUSIC. Efficient mechanisms for content filtering and summarization, modules for content transcoding and multi-channel delivery systems have already been developed and tested.
Member 7 – UNIFI-MICC (IT) Prof. A. Del Bimbo	The “Università degli Studi di Firenze” is an academic institution engaged in higher level education and research. The Dept. of "Sistemi e Informatica" (www.dsi.unifi.it) carries out research in the fields of Information Engineering, Computer Engineering, Automation and Control, Applied Mathematics. The main research activities carried out at the Visual Information Systems Laboratory of the Dept. of Sistemi e Informatica are related to Image Technologies and, in particular, Multimedia Information Processing, Annotation of and Retrieval from Image and Video Databases, Data Visualization, Advanced Human-Machine Interaction and Interfaces, and Software Engineering for Multimedia Applications. Systems have been designed and developed for: content based retrieval of images and videos, semantic annotation of images and videos, advanced human-machine interfaces based on virtual reality, advanced human-machine interaction based on computer vision, acquisition of realistic 3D models based on computer vision
Member 8 – FHG/IPSI (GR) Dr. Ulrich Thiel	IPSI focuses its research and development work on software applications for cooperative work, publication and information, and lifelong learning in real and virtual environments. The research areas comprise knowledge management and e-commerce, systems for individual or group learning, security in media and document management, digital libraries and information systems, database-supported publication tools, distributed publication environments for the common maintenance of extensive data, and services for mobile communication. These activities also cover the fields of planning and installing modern working environments, i.e., building elements and furniture equipped with high-quality information technology.
Member 9 – UG Dr. S. Ross	The Humanities Advanced Technology and Information Institute (HATII) was formed in 1997 to bring together Glasgow University's expertise in Information Communication and Technology (ICT) in the heritage sector. HATII’s research concentrates in the areas of technologies, methods, and theoretical developments that enable (a) access, (b) content analysis and appraisal, (c) evaluation and impact methodologies, and (d) preservation. Projects at HATII: (1) HATII is the lead site for ERPANET (Electronic Resource Preservation and Network) (IST-2001-32706) a European Union activity to enhance the preservation of cultural heritage and scientific digital objects. (2) It is a core partner in *The Digital Culture Forum* (DigiCULT Forum, IST-2001-34898), which monitors and assesses technological research and development and defines how they can be effectively deployed in the

	heritage sector (e.g. museums, libraries and archives). Its first major technology watch report was published in March of 2003. (3) The Effective Records Management (ERM) Project, £230k, with support from the JISC JTAP programme, investigated and piloted records management within the digital order. (4)With funding from the UK's Joint Information Systems Committee (JISC 5/99) HATII is managing the 'Developing the Collection of Historical and Contemporary Census Data and Materials into a Major Learning and Teaching Resource' (CHCC project). (5) It is responsible for the New Opportunities Fund Project that is creating and evaluating TheGlasgowStory, (6) has a major collaborative research project with the University of North Carolina (Chapel Hill) funded by the Delmas Foundation investigating how researchers use digital information, (7) and was a co-investigator in InterPARES I. HATII also runs an internationally recognised summer school in digitisation.
Member 10 – UNIDU Prof. N. Fuhr (DE)	DL-related research at the Univ. of Duisburg focuses on information retrieval models and methods for digital libraries: For information retrieval of semistructured data (XML), a new query language (XIRQL) is being defined and efficient processing methods are being studied. In the area of networked DLs, models for resource selection and result fusion are being defined, especially for heterogeneous environments with multimedia documents. Methods for strategic support for information access in combination with adaptive and proactive services are being developed, allowing for personalization and collaboration. Research on evaluation methodology and specific approaches (e.g. as leader of the INEX initiative) is also underway.
Member 11 – CWI (NL) Prof. M. Kersten	The goal of the DL-related research at the Centrum voor Wiskunde en Informatica is to generate multimedia presentations based on the results of a user query to a system. Four aspects are currently being studied: (a) modelling of discourse to steer the presentation generation process – both domain-independent methods and methods which make use of domain knowledge are being investigated; (b) dependencies of the user and domain models in the generation process; (c) characteristics of media types for presenting information to the user; (d) the extent to which graphic design knowledge can be included in the generation process, where colour is the aspect currently under investigation. In addition, the contribution of existing and developing Web and Semantic Tools to this research are also investigated. In particular the use of ontologies for expressing aspects of the other research topics and as output media of the results.
Member 12 – RISOE.DK (DK) Prof. A.M. Pejtersen	The Cognitive Systems Engineering Center at Risoe has developed a conceptual framework for ecological interface design(EID). Ecological interfaces visualize complex information in dynamic work spaces within structures developed from work studies of users' needs. Domain information is vizualized at different abstraction levels in a form that supports novices and experts' perceptual and cognitive capabilities. Current research focusses on visual, ecological interfaces for collaboratories.
Member 13 – FORTH (GR) Prof. Costantine Stephanidis	The Human - Computer Interaction (HCI) Laboratory of ICS-FORTH is an internationally recognised research centre of excellence with accumulated experience in user interface software technologies (novel interaction techniques/devices, toolkits and 4th Generation Languages for user interface development, wearable computing, virtual environments), and design

	methodologies and tools (user and context modelling, design techniques and processes, usability engineering). The Laboratory carries out leading research activities focused on developing user interfaces for interactive applications and telematic services that are accessible, usable, and ultimately acceptable for diverse users in the emerging Information Society. The main thrust of this line of work focuses on promoting the concept of User Interfaces for All, and fosters an evolutionary path towards more systematic and proactive approaches to the development of accessible and usable user interfaces. It involves ensuring accessibility at design time, and developing user interfaces to interactive applications and telematic services, which provide universal access and usability to all potential users. The Laboratory hosts and operates the Centre for Universal Access and Assistive Technologies. The main objective of the Centre is to support the equal participation and socio-economic integration of people with disabilities in the Information Society, by designing products and services accessible and usable by the widest possible end-user population.
Member 14 – Roma-1 (IT) Prof. T. Catarci	Participants in the NoE from Universita' di Roma have a long tradition of working on user interaction related issues. Their overall contribution can be regarded as one of the first and most significant examples of deep analysis and formalization of the interaction between the user and the database, which takes in consideration both usability issues and language related aspects. Currently, the research mainly concentrates on the following main topics: information access, information visualization, visual interfaces, usability, semantic web, cooperative information systems, data integration, data quality, ontology management. The UniRoma group has also implemented several prototypes of visual interfaces for database access and have been involved in many international projects on related topics. Among these projects LAURIN,a recently completed Telematics projectworked to establish a network of digitised newspaper clipping archives accessible through the Internet in a centralised fashion, for searching and for retrieving clippings; SEWASIE, which started in 2002, is designing and implementing an advanced search engine enabling intelligent access to heterogeneous data sources on the web via semantic enrichment to provide the basis of structured secure web-based communication.
Member 15 – UBRUN (UK) Prof. L. Kuljis	Research areas of the VIVID Centre at Brunel University are user interfaces, multimedia, visualization, visual programming, and collaborative environments. Specific concerns are: user interface design for different application areas; dialogue designs and interaction of different technologies; individual differences and the way individual differences and cognitive styles drive user interactions with interfaces; how spatial configurations and reconfigurations affect interpretations and representation of artifacts within the space; distributed cognition (the ways information flows between groups); the relationship between spatial semantic interfaces and the currently limited understanding of the effectiveness of these interfaces for information retrieval; and the relationship between spatial-semantic interfaces and users' understanding and interpretation of the underlying search space.
Member 16 – ICCS (GR) Prof. T. Sellis	The Institute of Communication and Computer Systems (ICCS) is associated with the Department of Electrical and Computer Engineering (DECE) of the National Technical University of Athens (NTUA). ICCS was established in 1989 by the Ministry of Education in order to carry research and development activity on all diverse aspects of telecommunications systems and techniques, computer systems, and their applications. Research activities in ICCS in the

	area of data modeling and querying center around two major areas: (a) supporting and formalizing context through the notion of alternative worlds, which are environments that give data an unambiguous interpretation. In this area context modeling in XML and XML querying models for the case of context-dependent data is at focus, and (b) catalog management, whereby portal catalogs are modeled and issues related to similarity search in catalogs, searching by structural similarity and querying as well as manipulation of catalogs, are of interest. It also supports multimedia retrieval, video summarization, abstraction schemes, content -based queries and sampling. Multimedia data transmission and modeling is also one of the aspects of the ICCS/NTUA.
Member 17 – UNIPD (IT) Prof. M. Agosti	Activities of the Research Group of the Department of Information Engineering of the University of Padova are concerned with the design, modelling and implementation of advanced information retrieval capabilities for digital libraries systems. This means that the focus of the research is to deliver enhanced contents to final users. An example of is the general study on annotations the group is conducting in the context of the ECD national project , where the relevant aspects of designing and developing an innovative service for annotating a digital library are addressed with the target of implementing a document annotations service as an advanced service for the end user. The group is involved in the University of Padova Ipsa project which aims at the design and construction of a digital library of drawings and illustrations of historic documents, where the digital library is constructed for use of researchers of art and history of scientific illustration. The research group is also interested in the evaluation of digital libraries systems, studying evaluation techniques for designing a remote evaluation protocol, integrated in the architecture of a DL system.
Member 18 – UniMI (IT) Prof. E. Bertino	DL-related activities at the Universita' di Milano currently include the investigation of techniques supporting query formulation and data presentation from virtual reality (VR) environments. Thus, VR and database techniques are being integrated. Such research is carried out in the framework of the DHX project (project IST-2001-33476). In addition, techniques and tools are being developed to automatically generate multimedia presentations, based on constraint languages. A third area of activity concerns security issues for database systems and advanced data management systems. Among the various research directions pursued, the most relevant are: - the Author-X project - investigating security, integrity, completeness, secure third-party publishing, secure dissemination strategies for XML data; - the DLAM project - investigating access control techniques for textual digital libraries; - the EUFORBIA project (project IAP 26505) - investigating filtering techniques for Web documents and pages.
Member 19 – UMIT (AT) Prof. H. Schuldt	The activities of UMIT Innsbruck address infrastructure support for medical information systems which are characterized by the distribution of data and applications, the mobility of clients, and by vital and stringent requirements for reliability and dependability at all levels in the information infrastructure. Examples for such applications are digital medical libraries like E-health warehouses or distributed electronic patient records. In terms of reliability at the application level, mechanisms allowing for the automated and context-dependent reconfiguration of application execution by optimizing application-

	specific quality-of-service parameters are needed. In order to build such a digital library infrastructure, aspects of information grids and peer-to-peer architectures will be combined. Digital library applications in medical domains include aspects of multi-object, multi-feature similarity search, multiple feature extraction, various classification, clustering, abstraction, and summarization techniques as well as context (location, time, situation) based relevance and relevance feedback. Moreover, digital library infrastructures in medical domains have to provide sophisticated data mining algorithms.
Member 20 – MPII (DE) Prof. G. Weikum	The MPII research group led by Dr. Weikum at the University of Saarbruecken has been working on XML data management, Web search and focused crawling, Web services and distributed workflow management, automated performance tuning of database and workflow servers, and selected system aspects of multimedia servers. In the area of multimedia data, the group participated in the Esprit LTR project HERMES on high-performance multimedia storage management from 1995 through 1998. In the area of intelligent search on XML data, the group currently pursues the CLASSIX project on classification and intelligent search on information in XML, supported by the German Science Foundation (DFG). In an applied project funded by the Ministry of Economy, Trade, and Industry of the Saarland, the group is developing focused crawling technology for the automated generation and maintenance of an information portal for small businesses and trades.
Member 21 – OFFIS (DE) Prof. Hans-Jurgen Appelrath	OFFIS participated in several projects of the national GlobalInfo initiative for digital libraries. Currently, OFFIS is member of the eVerlage project, which aims to combine electronic commerce with digital publishing, by testing forms of electronic supply, business models and payment methods on a test platform for GlobalInfo. The project LEBONED (Learning Environment Based On Non Educational Digital Libraries) uses digital libraries as repositories in Learning Management Systems. OFFIS has also research activities on application coupling and replication of data in medical information systems as well as component-based software engineering and configuration management for software evolution.
Member 22 – QMUL (UK) Dr. M. Lalmas	Queen Mary's University in London, is currently working on evaluation methodologies for the retrieval of structured documents, in particular XML retrieval, in terms of effectiveness, efficiency, and usability. The methodologies include the creation of test beds (e.g. document collections, queries and relevance assessments) and the development of metrics that take into account the structured nature of the data, and that reflect querying and browsing users behaviours. This work was carried out in the context of INEX 2002, the first round of a large-scale evaluation of XML retrieval, which was co-organised by QMUL. QMUL is also working on investigating the usage of structure in multimedia digital libraries, with the aim of devising principles regarding what type of structure allows what type of (effective) access to multimedia data. MUL is also representing the INEX evaluation group in the Network. Members are: IRIT - Univ. Paul Sabatier Toulouse III (FR), Univ. Pierre et Marie Curie (FR), Dept. of Computer Science, Univ. of Twente (NL), ILLC – Univ. of Amsterdam (NL), CWI - Amsterdam (NL), Dept. of Information Studies - Univ. of Tampere (FI), CS Dept - Univ. des Saarlandes, (DE), CS Dept., Univ. of Helsinki (FI), ETH Zürich (CH)
Member 23 – USG	The main activities of the team at the University of Strathclyde are evaluation

Dr. F. Gibb	of user interfaces, e-books and e-journals. Research covers the design, implementation and evaluations of novel user interfaces. Task oriented evaluations, covering both heuristic and empirical approaches have been used for the evaluation of interactive IR systems ranging from commercial search engines to research systems. User studies have involved children, students and educators. Current projects are concerned with developing tools to assist users retrieve information from heterogeneous and distributed multimedia digital libraries; and creating intuitive physical interface to the web, which will enhance the learning process for children.
Member 24 – IU (GR) Prof. S. Kapidakis	Research in Ionian University focuses on: (a) models and criteria for evaluation of electronic documents and collections, how to propose models (for libraries and users) for better managing, using and evaluating the Digital Libraries, (b) policies of accessing digital material in Digital Libraries, exploring policies that will make the Digital Libraries more user friendly and closer to user and author expectations, (c) User Behaviour Tendencies on Data Collections in a Digital Library, studying the user behaviour on collections with different characteristics, and cluster the collections and the users into classes of similar behaviour, (d) concurrent access interoperability problems are studied when using the same communication protocols and searching in one domain and how to extend the basic interoperability that is defined by the existing protocols to serve this goal (e) issues in real-time concurrent access systems, such as duplicate detection and records consolidation (f) cultural heritage multimedia collections interoperability metadata schemata, (g) semantics interoperability and the automatic fusion of multimedia features in higher level contexts, not explicitly expressed, by using information extraction and feature selection techniques, on subject gateway resources and digital collections described by different and non-compatible metadata and ontologies.
Member 25 – UPSXI (FR) Prof. N. Spyratos	The current DL-related work at the University of Paris-Sud is in the context of a IST European project called SeLeNe : Self eLearning Networks (Contract IST-2001-39045) and consists in studying the syndication of e-learning documents. A simple data model for the composition and management of learning objects (LO) in a distributed setting has been defined. The model features an abstract definition of LOs, as well as operations to create new LOs, to compose complex LOs from simpler ones, and to query a data bank of LOs spread over the network. The querying process is supported by a coordinator, or mediator which relies on annotations automatically extracted form the available LOs in order to describe their content. The model provides support for the specification of a concrete SeLeNe environment in which the authors of LOs are the basic peers and where communication between peers is assisted by the mediator.
Member 26 – UOS (UK) Dr. Leslie Carr	The Intelligence, Agents, Multimedia Research Group at the University of Southampton is a major research group of 100 people with an international reputation in digital libraries, open archiving, hypermedia, multimedia, knowledge management and Web Grid research. is a member of W3C and in 1997 hosted the ACM Hypertext conference. In the field of Digital Libraries, work on citation extraction and analysis digital libraries has been undertaken as part of the Open Citation (OpCit) project under the JISC/NSF International Digital Libraries programme. Also resulting from this work has been the internationally adopted EPrints software used for establishing research archives. In Knowledge Management, the group acts as the lead site in a six-year, multi-million pound interdisciplinary research collaboration of five UK universities, funded by the EPSRC, investigating the

	application of advanced knowledge technologies in the lifecycle of distributed information resources. under the UK national e-Science initiative, the group participates in several national testbeds (Combechem, MyGrid) aimed at emerging grid technologies in collaboration with industry and commerce and is pioneering the adoption of Semantic and Knowledge technologies within this context - the so-called Semantic Grid.
Member 27 – UEDIN (UK) Prof. P. Buneman	The University of Edinburgh database group has interests in the fusion of database technology and digital libraries. In particular, it has very strong links with people working in scientific databases, where both topics are crucial. Recent work of the group includes: the study of data provenance (where data comes from); database archiving, semistructured data and XML; constraints on semistructured data; database publishing; new storage technologies for XML.
Member 28 – IICM (AT) Dr. H. Krottmaier	Currently IICM Graz is heavily working on platform- and document-format independent solutions for knowledge-management systems. Methods on sharing annotations and markups between documents of different electronic-formats based on an existing scientific journal are investigated. Additionally an attempt is made to enhance the publishing process of an article to reduce the publishing time from article-submission to actual publishing of the article. Sharing of information related to the published documents with other publishing companies is the next goal. Therefore the currently used service is being enhanced with XML-related services such as XML-RPC and/or SOAP. This will allow reference analysis and user-adapted presentation of information also for already published documents.
Member 29 – TUW (AT) Dr A. Rauber	The Department of Software Technology and Interactive Systems (IFS) at the Vienna University of Technology (TUW) has carried out research activities on both fundamental and applied aspects of software technology and information systems. During the last five years 10 books and about 150 papers in different international conferences and journals were published. TUW participates in several major national and international research initiatives, with the addition of excellent staff funding from all sources. The Department is engaged in various third-party funded projects with partners from the mobile computing area (e.g. max.mobil), the software area (e.g. Microsoft Research, SAP, Software AG), the banking sector, and others, as well as participating in a national competence center on e-commerce (EC3). The department will bring into DELOS its long-standing experience in several disciplines of digital libraries related research, specifically with respect to information organization, retrieval, and visualization, both for text as well as multimedia documents, i.e. video and audio analysis, through a series of national and international projects. TUW has been the IT-partner of the national AOLA project building an archive of the Austrian National Webspace in cooperation with the Austrian National Library since 1999.
Member 30 – UNIURB (IT) Prof. Maria Guercio	The “Istituto di studi per la tutela dei beni archivistici e library” of the University of Urbino was created in 1998 to co-ordinate all the research and educational activities within the University of Urbino in the area of archival and library heritage, with specific reference to the creation, access and preservation of the documentary heritage. The Institute organises courses and manages research programmes in the area of archival science, electronic record-keeping systems, librarianship, information studies and legal studies for cultural heritage, digital preservation. The Institute has been involved in many national and international projects: as Italian co-ordinator in the InterPARES project for the long-term

	preservation of authentic electronic records (1999-2002) in the NPACI project for the preservation of Persistent Archival Objects conducted by the USA National Archives and the S.Diego Supercomputer Centre in the project funded by the Italian Ministry for University and scientific research in a industrial research project (3D Informatica, CNR, Consorzio Roma Ricerche) to run as test bed in evolving an Information Retrieval application into a XML product preparation of the dossier on the policies for preservation existing at European level for the International Conference of Florence on Digital Preservation /16-17 October 2003): agreement signed with Istituto Centrale per la Catalogazione (ICCU), Ministero per i beni e le attività culturali The institute is also running many projects at application level: to define a classification scheme and an electronic record-keeping standard for Sogei, the public software house of the Ministry for Finance, to define the archival functional requirements for the electronic records systems for Prisma Engineering (Filenet distributor); to create an Italian network for disseminating good practice and professional training in business records management (Centro per l'Innovazione nell'Impresa, Milan).
Member 31 – NTNU (NO) Prof. Ingeborg Solvberg	Department of Computer and Information Science at the Norwegian University of Science and Technology is conducting research in several areas of importance to Digital Libraries and the DELOS proposal. Modelling of multi-media digital objects and the development (automatic, manual) of metadata formats and descriptions supporting information seeking and retrieval in specific contexts and heterogeneous systems. Geo-referenced objects are of special interest; thesauri, gazetteers. Relationships and linking of objects in digital libraries. Semantic modelling and the web. Development of data models and tools for management of temporal media data (audio and video). Searching and browsing in large image collections, combining use of classical metadata and algorithmic analysis of image content. Large scale storage and delivery of multimedia data.
Member 32 – ULUND (SV) Dr. T. Koch	Research relevant to the DL domain at the University of Lund covers the following issues: efficient implementation of information services using components in a distributed Digital Library; specifically focused (or topic specific) crawling using automatic subject classification techniques based on integration of several approaches - statistical, link clustering, semantic (thesauri/ontology) and linguistic analysis; automatic and semi-automatic approaches to subject classification; proper use of heterogeneous metadata for subject mediation and interoperability in large-scale information systems; semantic enrichment to information and to end-user browsing and searching via concerted efforts in a continuum between "simple and cheap" traditional subject indexing and advanced ontology-based reasoning.
Member 33 – INRIA (FR) Dr. N. Boujemaa	Research topics relevant to the DL domain studied at INRIA: 1- Modelling visual appearance and construction of the image description space: global and local (2D/3D) image signature, data structure 2- face detection and recognition, object recognition,

	3- Interactive search and personalization: image database summary and overview by automatic categorisation, visual relevance feedback, visual query composition, ... 4- Cross-media indexing and retrieval: automatic textual annotation.
Member 34 – AUTH (GR) Prof. I. Pitas	The Artificial Intelligence and Information Analysis (AIIA) Laboratory at the University of Thessaloniki has for more than a decade conducted research in multimedia/digital image processing and related areas. Its topics of interest span the areas of digital image/video processing, computer vision, watermarking and IPR protection, biometrics, cultural heritage conservation, 3D image medical image processing, distance learning, virtual reality in medicine/dentistry, speech processing, signal processing, language engineering. The Laboratory has a track record of collaboration with researchers at other Universities, Institutes and with industrial partners. These activies have been supported by a range of grants including those from the European Community.
Member 35 – NANETH (NL) Dr. J. Hofman	The Nationaal Archief has obligation to ensure access and preservation of archival records through time, both paper and digital. In this respect it has a longstanding experience in preservation of paper records and providing public access. Over the last seven years the NA has been developing its expertise through a series of pilot projects to to acquire, ingest and preserve digital archival records. It is partner in different international collaborative efforts, such as the European funded ERPANET project (2001-2004), the InterPares research project (2002-2007), that has as objectives to provide guidelines, policies etc. on preserving digital objects in an authentic and understandable way; the DLM-forum (an EEIG), that brings together national archives in Europe on issues regarding electronic records and preservation, and the ISO TC46/SC11, that is working on standards for records and records management (including metadata). Through these activities and its pilot projects the Dutch National Archives has worked to shape research and innovation in digital preservation and contributed to the delivery of tools and processes.
Member 36 – TZI (DE) Prof. H. Otthein	One of the research areas at the TZI Image Processing Department, University of Bremen, is research on new methods for the automatic analysis and annotation of multimedia documents, i.e., images, video or text, with the aim to support an integrated retrieval of multimedia documents in digital libraries. In recent years TZI has participated in several national and European research projects in the field of automatic image and video indexing. The research activities have resulted in prototypical implementations of modules included in a video analysis system. Currently work is ongoing on the annotation and classification of video sequences on a semantic level. The Department primarily deals with the content-based analysis of images and image sequences. For this purpose, methods from artificial intelligence as well as from image processing are adapted and employed. As a result of this combination a technological competitive advantage in the area of the content-based image retrieval and the interpretation of images and scenes was demonstrated in the project IRIS - Image Retrieval for Information Systems. Beyond indexing of visual data TZI is also researching on how to distribute and transport multimedia content to end users independently of network (Web,

	LAN, W-LAN, UMTS, GPRS) and device (Notebook, PDA, mobile phone, etc.) available. The focus here is on streaming of multimedia, network interoperability, and media networking.
Member 37 – OEAW (AT) Dr. Schuller	OEAW is the audiovisual research archive of Austria. Founded in 1899, it has accumulated one of the world's major research sound collections. Since 2001 the Archive's activities have been extended to include videographic research footage. Systems have been built up for digital audio and, most recently, for uncompressed digital video archiving. Considerable research activities are also conducted in the field of handling, storage, and preservation of analogue and digital audiovisual data carriers. The Archives has ample experience in re-recording, the optimal signal retrieval from all analogue audio and most video formats. Training courses are held on a regular basis on all issues related to storage, preservation and digital archiving, in Austria and abroad.
Member 38 – Univ. Leeds (UK) P. Wheatley	The University of Leeds has been involved in a range of collaborative projects in digital preservation including the nationally funded CEDARS Project (1998-2002), and the internationally supported (JISC in UK and NSF in US) CAMiLEON Project (1999-2002). The digital preservation team at Leeds has developed internationally respected expertise in digital preservation technology and practical experience of successfully preserving digital science data from the 1960s to the present day. The preservation team is continuing to provide input to international initiatives in digital preservation policy as well as developing new digital preservation solutions as part of the JISC funded Representation and Rendering Project.
Member 39 – UCO (DE) Prof. M. Thaller	The Universität zu Köln, Germany's largest university, enrolls around 65.000 students and supports numerous research centres. It has recently set a focus of its research activities on media studies, including a course and research activities in media related computer science. The Faculty of Arts has two specializations: The "Sprachliche Informationsverarbeitung" basically implements a model of Computer Linguistics; the "Historisch-Kulturwissenschaftliche Informationsverarbeitung (HKI)" (cf. www.hki.uni-koeln.de) is unique in providing computer science training for non-linguistic disciplines. The main research activities focuson various aspects of digital library systems. Software developed and maintained by HKI supports some of Germany's largest digital libraries. Among HKI recent grants two are worthy of mention: One to create a prototype for the digitization of all existing German incunabula and the other for an evaluation study encompassing all digitization activities undertaken so far under the auspices of the German National Research Council. Besides general research in the area of non-relational /native XML databases, these activities have recently also lead to the development of a vast heterogeneous database backbone ("Prometheus"; cf. www.prometheus-bildarchiv.de) funded by the German Federal Ministry of Research for a pilot project testing the possibilities of a virtually unified server uniting the image collections of all German art history departments.
Member 40 – CF (IT) Prof. Benedetto Benedetti	The main objective of the Consortium FORMA, led by Scuola Normale Superiore in Pisa, is to promote cooperation between large and small museums by defining best practices for communication, conservation and management; by stimulating applied research in this area; by organising specialised courses on assessments, protocols and best practices. The Consortium will constitute a permanent board of experts and will support the needs of small museums networks. In addition, applied research will be dedicated to the development of a system for access to museum collections (paintings, objects on relief, sculptures, architectural environments) for people with sight impairments. Members of Consortium FORMA are the Scuola Normale Superiore, Pisa, the

	National Museum for Cinema and Visual Archives, Turin, ISAE-Institute of Studies and Economic Analysis, Associazione Civita Rome, Electa-Elemond–Mondadori Department of Museums & Exhibitions, CISA-International Centre for Architectural Studies "Andrea Palladio" Vicenza, INSR – The National Institute for Studies on Renaissance, Florence, ICR Central Institute for Restoration (Rome), Soprintendenza Archeologica di Pompei - Ministry of Cultural Heritage.
Member 41 – SICS (SV) Dr. Preben Hansen	The Swedish Institute of Computer Science (SICS) is a non-profit, independent research organization with about 1000 researchers. SICS mission is to contribute to the competitive strength of Swedish industry by conducting advanced and focused research in strategic areas of computer science, and actively promoting industrial use of new research ideas and results in industry and society at large. The HUMLE research group develops new techniques and design metaphors to make the interaction between human and computer richer, social, and better adapted to human beings. The research is organised into three overlapping themes: Information Access research, Open and Adaptive Service Infra Structures and Social Computing. We focus on information access, social computing, mobile scenarios, individual differences, and language engineering.
Member 42 – UNIMORE (IT) Prof. Rita Cucchiara	The University of Modena and Reggio Emilia is a very old academic institution with more than 16.000 students. Since 1990 it has two Faculties of Engineering, one in Modena and one in Reggio Emilia, mainly focused on information technology and mechanics. The Dipartimento di Ingegneria dell'Informazione (DII) of Modena and Reggio Emilia is the research institution grouping research activities in computer engineering, electronics and telecommunications. The most important research fields covered in DII are microelectronics, control for automotive, wireless communication, computer architecture (multimedia and web server), computer vision, databases, information systems, middleware and agent-based software. Within DII, the Imagelab (http://imagelab.ing.unimo.it) and the WebLab (http://weblab.ing.unimo.it) are devoted to research activities related to Digital Libraries. Imagelab is involved in researches in image analysis, computer vision and multimedia with much collaboration with public and private institutions. In medical imaging, Imagelab collaborates with medical Departments for melanoma skin analysis and telemedicine, and with the Burnham Institute (CA- USA) for echocardiography analysis. In motion analysis and surveillance is involved in several projects for Formula-1 car telemetry, urban traffic control and domotics (home automation). The current main activity (in the context of National FIRB project) focuses on smart video server and high performance remote video access exploiting computer vision and semantic transcoding techniques. WebLab is involved in research on Web server and network workload analysis, quality of service and cluster of server performance analysis.
Member 43 – MUNI (Czech Republic) Prof. Pavel Zezula	The "Faculty of Informatics, Masaryk University, Brno" is an academic institution engaged in high-level education and research. The database research group at this faculty is primarily working on storage structure support for large-scale digital libraries. An important part of the research concerns similarity search access methods for metric distance (dis-similarity) measures. Current research is focused on the difficult problems of similarity joins in metric spaces and on scalable and distributed structures for the same type of

	data. The second major stream of research activities concentrates on the index structures for XML data. Most recently, the group has started to work on advanced search methods for semi-structured XML data, integrating XML pattern matching with information-retrieval-style ranking.
Member 44 – UVA (NL) Prof. Arnold Smeulders	The University of Amsterdam is an academic institution engaged in higher level education and research. It is a public institution providing higher level education to more than 20.000 students in several fields, covering medicine, humanistic, scientific and technological areas. Technological disciplines are the main subject for the Faculty of Science. The Laboratory for Intelligent Systems has three research groups. One of them, Intelligent Sensory Information Systems, consists of five faculty funded by the University and eighteen others from a variety of sources. ISIS has an extensive track record in public-private partnerships. The main research activities are in the fields of multimedia information processing, annotation of and retrieval from image and video data repositories, data space visualization, theory of computer vision, color in computer vision, multimedia data mining, and cognitive vision. Our most fundamental aim is to close the semantic gap between pictures and a verbal description of the pictures. We aim to do so by modelling physical, psychological and cultural rules governing pictures, as well as learning concepts from large multimedia repositories. In this context, systems have been designed and developed for content based retrieval of images and videos, semantic annotation of images and videos, multimedia ontology-based knowledge systems, and, advanced human-machine interaction for data space visualization.
Member 45 – UNISI (CH) Prof. Davide Bolchini	The Technology Enhanced Communication Laboratory (TEC-Lab), in the Faculty of Communication Sciences at the University of Lugano ((UNISI-Universita' della Svizzera Italiana), takes its stand at the frontier between the humanities and new technologies, fully aware of how in fact studies on communication may contribute to improving the development of computer applications and of web site especially. TEC-Lab has managed to invent a successful strategic formula thanks to which these two research territories meet or converge. As a result of this, TEC-Lab has been able to join forces with a team of scientific partners working on two European research projects, which lasted two years and concluded in January of this year: UWA (Ubiquitous Web Applications) e VNET5 (User-centred Product Creation in Interactive Electronic Publishing). The Laboratory also works closely with the Politecnico of Milan on several projects, both national and European, contributing its own background and experience at the stage when requirements are analysed, and when web-based hypermedia applications are designed and assessed.
Member 46 - MTA SZTAKI (HU) Dr. Laszlo Kovacs	The primary aim of MTA SZTAKI Department of Distributed Systems is to perform Research and Development in distributed computer applications, including World Wide Web information services, groupware and digital library systems. Other activities are in the fields of communication systems between the civil sphere and the public authorities, scientific and technical visualizations, digital art. Partnership: in developments of Hungarian E-governmental services. Building and maintaining World Wide Web services for the Prime Minister's Office and the web site of the Hungarian Government. Several groupware software solutions and services such as voting, rating, web-based group discussion and communication software, workflow, group calendar, project management tools

	are developed.
Member 47 – UNIBA (IT) Prof. Giovanni Semeraro	LACAM, the Knowledge Acquisition and Machine Learning Laboratory, is part of the Department of Computer Science of the University of Bari, Italy, and has been active in the area of knowledge acquisition and multi-strategy learning since 1986. Research at LACAM spans from knowledge acquisition to machine learning techniques, with the aim of improving Human-Computer Interaction (HCI). The main research activities are: - machine learning methods and systems based on symbolic and numerical approaches, integration of numerical representations through first-order logic for the development of reasoning techniques under uncertainty, methods and systems for automatic revision of logic theories; - Intelligent document processing: paper document acquisition and document image understanding, document understanding and text summarization; - spatial Data Mining; - multimedia and multimodal human-computer interaction, visual languages, visual query systems for knowledge bases; formal definition of the communication languages and paradigms for data and knowledge representation, Web interfaces, user modeling methods for the development of adaptive interfaces, usability of interactive systems; - intelligent tutoring systems.