| Cover Sheet for Proposals | *JISC Capital Programme* |
|---|---|

**Name of Capital Programme:** Repositories and Preservation Programme

**Bid for Call Area :** (Please tick ONE BOX ONLY, as appropriate)

### Tools and Innovation (Strand B)

| | **Call Area I – Tools and Innovation Projects** | Please specify area of proposed project eg *'metadata generation and validation'* |
|---|---|---|

### Discovery to Delivery (Strand C)

| | **Call Area II – Discovery to Delivery Projects** | **a)** Version identification framework<br>**b)** Persistent identifier interoperability demonstrator<br>**c)** Federated access management and repositories<br>**d)** Semantic interoperability demonstrator |
|---|---|---|

### Repository Start-Up and Enhancement (Strand D)

| | **Call Area III – Repository Start-Up and Enhancement Projects** | **a)** Repository start-up projects<br>**b )** Repository enhancement projects |
|---|---|---|

### Digital Preservation and Records Management (Strand H)

| | **Call Area IV – Digital Preservation and Records Management Projects** | **a)** Digital preservation across the lifecycle<br>**b)** Models and implementation of preservation services<br>**c)** Preservation tools development |
|---|---|---|

### Shared Infrastructure Services (Strand I)

| | **Call Area V – Shared Infrastructure Services Projects** | **a)** Pilot implementation of licence registry<br>**b)** Pilot national name and factual authority service<br>**c)** Scoping an architecture to support digital policy management<br>**d)** Scoping a terminology registry |
|---|---|---|

**Name of Lead Institution:** UKOLN, University of Bath

**Name of Proposed Project:** Terminology registry scoping study

**Name(s) of Project Partner(s):**

**UKOLN, University of Bath; University of Glamorgan;**

**Non-funded supporting partner: OCLC Office of Research, USA**

**Full Contact Details for Primary Contact:**

Name: Rachel Heery Position: Deputy Director UKOLN  Email: [r.heery@ukoln.ac.uk](mailto:r.heery@ukoln.ac.uk) Address: Bath, BA2 7AY Tel: 01225 386580 Fax: 01225 386838

| | |
|---|---|
| **Length of Project:** | **6 months** |

| | | | |
|---|---|---|---|
| **Project Start Date:** | 1 March 2007 | **Project End Date:** | 31 August 2007 |

**Total Funding Requested from JISC:**  £35,474

**Funding Broken Down over Financial Years (April – March):**

| **Apr06 – Mar07** | **Apr07 – Mar08** | **Apr08 – Mar09** |
|---|---|---|
| **£5,912** | **£29,562** | |

**Total Institutional Contributions:**

| **Percentage Contributions over the Life of the Project:** | **JISC 80%** | **PARTNERS 20%** |
|---|---|---|

**Outline Project Description**

The study will analyse issues related to the potential delivery of a Terminology Registry as a shared infrastructure service within the JISC Information Environment.  The study will consider how a Registry might support development of terminology and other services within the context of a services oriented environment. The role of a terminology registry will be considered in relation to other components of the information landscape, in particular with regard to other JISC IE shared infrastructure services, such as the JISC IE metadata registry (IEMSR) and the JISC IE service (and collection) registry (IESR). In addition the study will draw on experience of the use and development of terminology and ontology registries in other domains, particularly within the e-Learning and e-Science domains, and will draw on experience from international initiatives. The study will describe usage scenarios and use cases, investigate requirements and sustainability, study costs and benefits. It will look at organisational questions such as who is to create, maintain and host the content of the registry and at cooperation with similar registries. Architectural issues will be explored, in particular the potential for co-ordination of registry efforts within the JISC IE and across domains. The scoping study will make recommendations on which JISC can base decisions on future provision of a terminology registry.

| | | |
|---|---|---|
| **I have looked at the example FOI form at Appendix A and included an FOI form in the attached bid (Tick Box)** | **YES** | |

| | | |
|---|---|---|
| **I have read the Circular and associated Terms and Conditions of Grant at Appendix B (Tick Box)** | **YES** | |

# Terminology Registry Scoping Study

A proposal submitted to the JISC by a partnership led by UKOLN, University of Bath in response to the 4/06 JISC Capital Programme Call: Repositories and Preservation Programme: Strand I Shared Infrastructure services.

This is a proposal for a **Terminology Registry Scoping Study** to be led by **UKOLN, University of Bath** partnered by the **University of Glamorgan**, with unfunded support from **OCLC Office of Research**. Funding is sought for **£35,474** with a planned duration from 1st March 2007 to 31 August 2007. The partners have recognised expertise in terminology services technology and development, as well as experience in various registry development projects for the JISC and other funders. This study will be undertaken by staff who are in post and are experts in the field.

## 1. Introduction

The study will analyse issues related to the potential delivery of a Terminology Registry as a shared infrastructure service within the JISC Information Environment. The study will consider how a Registry might support development of terminology and other services within the context of a services oriented environment. The role of a terminology registry will be considered in relation to other components of the information landscape, in particular with regard to other JISC IE shared infrastructure services, such as the JISC IE metadata registry (IEMSR) and the JISC IE service (and collection) registry (IESR). In addition the study will draw on experience of the use and development of terminology and ontology registries in other domains, particularly within the e-Learning and e-Science domains, and will draw on experience from international initiatives. The study will describe usage scenarios and use cases, investigate requirements and sustainability, study costs and benefits. It will look at organisational questions such as who is to create, maintain and host the content of the registry and at cooperation with similar registries. Architectural issues will be explored, in particular the potential for co-ordination of registry efforts within the JISC IE and across domains.

The scoping study will make recommendations on which JISC can base decisions on future provision of a terminology registry. It is envisaged that the work will inform the development of the Information Environment, the e-Framework and e-Infrastructure initiatives. The project will also contribute to any future JISC strategic development activities.

The proposal builds on the rich experiences of the partners in the area of terminologies and Networked Knowledge Organization Systems and Services (NKOS) and on significant work regarding registries. The lead partner UKOLN is active in the two JISC Shared Infrastructure Services projects most relevant to the Terminology registry: IEMSR and IESR which both aim to inform humans and to support m2m services. Earlier this year, UKOLN carried out JISC commissioned reports relevant to this study: The Shared Infrastructure Services Review and, in partnership with the University of Glamorgan, the Terminology Services and Technology Review. Both partners add rich and long-term experiences with relevant national and international activities and projects, especially the earlier terminology registry activities of the international NKOS network. Unfunded support will be contributed by the OCLC Office of Research with involvement of Diane Vizine-Goetz, lead researcher on the Terminology Services research project, and Andrew Houghton, lead developer on the same project.

The partners are well suited to cooperate with and feed into the Information Environment (IE) Testbed where shared infrastructure services will play an important part. The study will provide relevant use cases and service descriptions related to terminology services and registries, both to the Repositories Research team synthesis and to the e-Framework

## 2. JISC context

Shared infrastructure services are essential building blocks for an efficient and effective information and communications environment. These are services that operate as underlying machine-to-machine (M2M) services, although they may well in addition provide access to human users (preferably using the same underlying M2M services). The recent JISC Shared Infrastructure Services Synthesis Study makes several recommendations regarding development of shared services and these will be used to inform the Terminology Registry scoping study.

Increasingly registries are seen as way to support M2M web services that make up shared infrastructure. A

Terminology Registry would have particular relevance in supporting web services that might enhance subject based resource discovery. This is of particular interest to the Repositories and Preservation Programme that faces a challenge as to providing subject views onto repository content.

The scoping study will provide the background for future JISC decisions on the potential delivery of a Terminology Registry as a shared infrastructure service, discussing the costs and benefits and the context in which it might be created and maintained. The study will focus on requirements and potential delivery of a registry that would disclose information on existing terminologies (vocabularies) in common use within higher education in the UK, supporting use of terminologies in the context of "Discovery to Delivery". The study will advise on possibilities of combining registry tasks with existing JISC registry services (such as the JISC IE service/collection registry) or re-using other terminology registry solutions.

In common with other registry services, once a Terminology Registry is populated with useful information a number of services might be built upon it exploiting the content. These services might have relevance across domains. The registry might support a range of tasks such as metadata creation, information management, knowledge organisation, discovery and retrieval, and it might well be relevant beyond the area of repositories, for example in digital curation and preservation, in e-learning, in e-infrastructure, in digital library, semantic web, museum and archive communities and in commercial and open e-publishing. The scoping study will discuss common interest and overlap of effort with these related communities and propose options for cooperation. Whilst taking the wider perspective into account, the scoping study's main focus will be on the role of such a registry in delivering enhanced resource discovery within the JISC Information Environment.

## 3. Background

A terminology registry lists, describes, identifies and points to sets of vocabularies available for use in information systems and services. It can cover free and publicly available, fee-based and restricted, or organisation-internal vocabularies.

The registry allows discovery of suitable schemes for information or, potentially, use, by exposing rich metadata about them for navigation and retrieval. The metadata can hold information allowing the selection of schemes suitable for different purposes, address information for contacting owners and maintainers, hypertext-links to connect to the vocabularies or maintainer sites, information to differentiate between versions and identifiers, names and labels to unambiguously refer to a given scheme.

Terminology registries can hold scheme level information only, or comprise the member terms, concepts and relationships as well, or even list services based on terminology (such as automatic classification, term expansion, disambiguation, translation, semantic reasoning).

Registries should, if used as a digital infrastructure service, make their content available for both comfortable human inspection and for machine-to-machine access.

## 4. Aims and objectives

The study's overall aims are:

- to inform the development of shared infrastructure for resource discovery

- to describe the scope and potential use of a terminology registry

- to analyse requirements for services based on a terminology registry

- to help stakeholders understand the need for this component of a shared infrastructure

In order to meet these aims the study will have the following objectives:

- to develop a set of usage scenarios and use cases that demonstrate how and why a terminology registry as a shared infrastructure service is required;

• to gather these requirements from various sources, such as documentation from JISC projects and IE architecture papers; prior work elsewhere; contact with key stakeholders

• to synthesise the outcomes of efforts to date, from JISC activities and the wider context;

• to include the international and commercial context;

• to identify potential risks related to terminology registries as shared services;

## 5. Overall approach

In order to achieve the aims and objectives, the study will focus on identifying relevant information available from prior efforts (see Background section) and project documentation, supplemented by information obtained through email, telephone calls and a small number of face-to-face meetings. The study will also use expertise available at UKOLN and the partners to inform the study in appropriate areas.

The study will comprise the following strands

• Requirements: usage scenarios, prior and related work, functionality, content

• Role of Registry: priorities for content and functionalities to meet requirements

• Architecture and Technologies: overview of relevant technologies

• Governance and organisational issues: quality control, policies, sustainability, business models, cost benefits

Scope and boundaries of the work

• Consultation will take place with key JISC services, projects and executive across digital library, research and learning domains (to include representation of repositories and digital preservation in particular)

• Due to the short timescale, the study will concentrate on gathering requirements from the most relevant stakeholders in the wider community (to include key vocabulary owners relevant to JISC)

• An international perspective will be sought via email and possible telephone interview using UKOLN and the partners' contacts.

Important issues to be addressed include but are not limited to:

**Requirements:** These will be expressed through scenarios and use cases. This activity will draw on existing collections of scenarios and use cases within the UK and beyond (e.g. Shared Infrastructure Services Review, Repositories Research Team synthesis, IE Services Registry, NSDL Registry). The study will also construct new scenarios and use cases as appropriate.

The study will take into account lessons learned in current and previous efforts: parallels in the printed era, initiatives in wider communities (see background section e.g. eLearning - Becta Vocabulary Tool; cultural heritage - MLA, mda; e-Science - service registries such as Grimoires). Potential for co-ordination, integration and reuse will be considered.

**Role of registry:** Role in scholarly workflow; role in digital curation and preservation; relationship to terminology services; comparison and relationship to metadata and service/collection registries in general and to the aims, objectives and deliverables of related individual JISC shared services and projects (i.e. IESR and IEMSR, HILT), their current status and potential interaction with each others deliverables; scope of a future registry with regard to domains and application areas

**Architecture and Technologies:** protocol options for M2M access; relationship to and co-operation with other

registries; centralised vs. distributed solutions; standards, syntax and registry technologies

The study will consider representation and formats of vocabularies, terms and concepts (SKOS, OWL etc.), and access protocols (Zthes etc.), in case the individual parts of a vocabulary are addressed by or accessed from the registry. There will be consideration of what information about available representations might be included in the metadata information about a given vocabulary, if applicable. (Tudhope and Koch are members of the BSI BS 8723 Part 5 Standards Committee investigating "Exchange formats and protocols for interoperability when using structured vocabularies"). There will be consideration of the use of persistent identifiers in relation to vocabularies.

**Functionality:** priorities regarding functionality will be identified to meet requirements

**Content:** priorities regarding content will be considered regarding schemes, types of schemes, domains to be covered; inclusion of member terms/concepts; metadata schema; feasibility of a typology of terminologies/KOS.

How will the registry be populated? Will vocabulary owners enter information in similar model to the IESR? Is there potential for standard way of declaring a vocabulary?

**Governance and Organisational issues:** the study will include consideration of policies regarding the use of the registry and the terminologies; how will quality control be enforced?

Creation, hosting and maintenance; could a terminology registry form part of IESR or be an extension of IEMSR or other metadata registries?

**Business models and sustainability;** Business models for the provision of infrastructure is a complex issue. The study will look at existing comparable examples and discuss different options in principle. Costs and benefits, potential return on investments. While quantitative calculations may not be possible to provide, qualitative reasoning about these important considerations is certainly necessary. IPR of the registry content.

## 6. Prior terminology registry efforts

The study will be informed by lessons learned from previous registry efforts. Before Web usage became popular in the early nineties, comprehensive lists of KOS were only available in special printed volumes gathered by publishers or large organisations. The description/metadata provided was usually rather poor and did not very well support decisions about which KOS to use. National, regional, local and domain organisations often created and maintained lists of KOS in use by their own organisation.

There have been a number of efforts to maintain such lists. One of the larger and more recent such lists, the Thesaurus Guide [Thesaurus guide], published by the EU Commission, and containing about 700 vocabularies available in at least one of the EU languages, was also available as a database between 1993 and 1998. More than 2000 classification schemes, subject heading lists, and thesauri in the English language are physically collected at the University of Toronto and catalogued as publications in the Subject Analysis Systems (SAS) Collection [Subject analysis] in the University of Toronto Library online catalogue, and can be retrieved from there. WorldCat (OCLC) [WorldCat] contains many publication records cataloguing terminologies. Since 1996 several lists of online available KOS in digital formats have been created, however none is consistently enlarged or maintained [e.g. Koch; HILT]

The commercial company Synapse (now: Factiva) started "Taxonomy Warehouse" [Taxonomy Warehouse] in 2003, a directory of taxonomies, thesauri, classification and categorization schemes from around the world, initially with about 200 records. It has just been relaunched in October 2006. Here, a simple metadata schema is used to describe vocabularies. Taxonomy Warehouse focuses on taxonomies for corporations and offers more than 550 taxonomies, arranged in 73 subject domains, produced by 260 publishers in 39 languages. More than 100 of these taxonomies can be licensed directly through Taxonomy Warehouse. It would be useful for the study to examine how well the scope and services offered fit with requirements of the JISC IE.

For some time the Dublin Core Metadata Initiative (DCMI) developed and tested a registry of "vocabulary encoding schemes", alongside its metadata registry, featuring a simple metadata schema to describe and label/name available vocabularies to be used in metadata records. For different reasons, mostly related to governance issues, this effort was cancelled in 2004. However, in the USA the NSDL Registry is now being developed using a highly similar approach.

The NKOS network [NKOS] started an effort to design a terminology registry in 1998, emanating from discussions at

the second NKOS workshop at the ACM Digital Library Conference. A small task force led by Linda Hill subsequently developed a very detailed metadata schema for the purpose, containing most of the information one would need to make an informed decision about the selection of an appropriate vocabulary. Version 2 was published on the NKOS website in Nov. 1998 [NKOS Registry Version 2]. Prior to the NKOS workshop 2001, Diane Vizine-Goetz from OCLC Research developed a more formal document as a draft, converting most of the descriptive data selected in the prior versions into a Reference document for data elements, based on Dublin Core elements described according to the ISO 11179 standard [NKOS Registry Version 3]. As yet no suitable host has been identified to fund and maintain the development of such a terminology registry. Terminology registries were one of the main topics at the NKOS Special Session at DC 2005, bringing together the (DC) metadata and NKOS communities, featuring a main presentation by Rachel Heery [Heery].The 2006 European NKOS workshop, again discussed the need for a registry.

Government is another application sector which has shown a lot of interest in the terminology registration issue. The Canadian Government [Libraries] runs an internal registry of vocabularies in use. US Government agencies (DoD, EPA, USGS, National Cancer Institute, Lawrence Berkeley National Lab. etc. including some European partners such as EEA) have engaged in a large five year project started 2004/5 called XMDR, eXtended Metadata Registries [XMDR]. It builds upon and contributes to the further development of the ISO 11179 Metadata Registries family of standards [ISO 11179]. This effort has close links to the Language Engineering community and most related ISO subcommittees (SC 32, TC 37/SC 4). Compared with the other efforts mentioned here, the focus seems to be more on a registry of individual terms than on vocabulary schemes and collections [Bargmeyer].

Apart from the motivations behind the initiatives described above, the need for terminology registries has been underlined by a number of current initiatives. The study will consider how current initiatives might contribute to meeting JISC requirements.

The UK museum and heritage sector has begun to take steps (following the early NKOS registry approach),to progress from initial unsystematic terminology descriptions on the "WordHoard" web pages to a more easily managed online reference source containing systematic, consistent and complete descriptions of relevant terminologies and subsequently moving towards a formal registry of some kind [Lee]. Such a registry is needed to assist in creating resource metadata according to the UK museums standard SPECTRUM and the historic environment standard MIDAS, as developed by the MDA and the Forum Information Standards in Heritage (FISH). Today, the SPECTRUM Terminology Bank offers limited metadata about relevant terminology resources [SPECTRUM Terminology].

The US NSF funded National Science Digital Library (NSDL) project has started to develop both a metadata and a vocabulary registry [NSDL Registry], in one common registry. At this time, primarily a few education vocabularies are registered. The metadata about each scheme is very limited. The registry project aims, however, to address term history, vocabulary versions and SKOS encoding and provides some use cases.

During a renewed effort to discuss and further develop a typology of KOS at the NKOS workshop at ECDL 2006 [Tudhope], the extensive discussion constantly went back to underline the need for a terminology registry of individual instances of KOS systems, rather than, or in parallel to, a general typology. It is likely, however, that a typology would be required for an effective large scale registry of vocabularies. A task force of NKOS is expected to take this work forward again.


## 7. Project Deliverables and Timetable

| Deliverables | Month | Lead Effort + partners |
|---|---|---|
| Project plan | 1 | **UKOLN** + partners |
| Intermediate report (draft) | 4 | **UKOLN** + partners |
| Final report | 6 | **UKOLN** + partners |
| Dissemination | 3-6 | **UKOLN** + partners |
| Project management | 1-6 | **UKOLN** |

**Report** The final report synthesising the outcomes of the scoping study, will be preceded by an intermediate report end of month 4, which will form the basis for further discussions with JISC and to prompt feedback from stakeholders.

**Dissemination** The final version of the scoping study will be published on the websites of JISC and the partners. It will be widely advertised in relevant national and international lists, blogs and fora and presented at workshops and conferences, e.g. at NKOS workshops 2007, digital library and repository related conferences and at JISC programme events. The study and its outcomes will be introduced to international and cross-community registry related cooperation contexts. Vocabulary owners, the language engineering and terminology community and related standardisation efforts will be addressed as well.

**Project Management** Project management and partner co-ordination will be provided by UKOLN and will be achieved by an initial project start-up meeting, a mid-term meeting and a closure meeting. Communication between partners will be supported by email, conference calls and informal methods. Project reports (financial and synthesis) will be supplied/co-ordinated by the UKOLN Resources Co-ordinator. Project staff will work in partnership with members of relevant JISC Development teams, provide progress updates as required and participate in programme evaluation activities.

## 8. Stakeholder analysis

An indicative stakeholder analysis is included here to illustrate potential range of stakeholders

| Stakeholder | Interest / stake | Importance |
|---|---|---|
| JISC projects (e.g. IESR, IEMSR, HILT, GeoXwalk, ) | Potential modification of future direction. Cooperation. | High |
| JISC services (e.g., MIMAS, EDINA) | Potential contributor and user of registry services | High |
| Digital Curation Centre | Cooperate with representation information registry | Medium |
| e-framework | Definition of registry services | High |
| e-science/infrastructure | Collaborator, data exchange, re-use of registry software | High |
| Other domains: Museums Libraries and Archives Council (MLA), NHS, e-government | Collaborator, data exchange, re-use of registry software | medium |
| Vocabulary owners | Cooperation | High |
| International registry initiatives | Cooperation | Medium |

In addition, the collaborative proposal addresses Welsh priorities concerning promotion of research capability and collaboration. Progress towards a terminology registry will support the development of e- and distance learning/research through enhancements to ongoing Repository, JISC Information Environment and eFramework initiatives.

## 9. IPR

The project will comply with the terms of the JISC Funding Agreement. It is expected that the final report will be made openly accessible with Creative Commons license as appropriate.

## 10. Risk Assessment

| Risk | Level | Likelihood | Contingency |
|---|---|---|---|
| Recruitment difficulties | Medium | Low | Existing staff will work on study |
| Loss of a team member | High | Low | Multiple staff at each site have the expertise and skills required. |
| Project is over-ambitious in scope and/or over-runs | Low | Medium/Low | Agree scope with JISC by means of project plan |
| Difficulties in getting feedback from wider community | High | Medium | Prioritise drawing up structured interviews. Arrange interviews early in project |

## 11. Project partners and key personnel

This bid is led by UKOLN, University of Bath.

### UKOLN, University of Bath

UKOLN is a national centre of expertise in digital information management. It provides services to the library, information and cultural heritage communities. UKOLN provides support for the JISC Digital Repositories Programme, is a partner in the Digital Curation Centre and has either led or is a partner in the following projects: ePrints UK, Intute Search Infrastructure, Grand Challenge in Engineering (EPSRC), Driver (EU), Delos Digital Library Network of Excellence (EU). UKOLN is a partner in IEMSR (lead) and IESR and many related earlier and international projects, all highly relevant to registries and terminology. UKOLN has carried out several studies and reviews for JISC, including the recent Shared Infrastructure Services Synthesis review and the Terminology Services and Technology review.

**Rachel Heery** works for UKOLN as Deputy Director leading the Research and Development team. Rachel has undertaken research over recent years in the field of metadata, resource discovery and information architectures. Rachel is working closely with the JISC as part of the Repositories Research Team, supporting both the Digital Repositories Programme and the new Repositories and Preservation strand of the Capital Programme. Her recent research has been in the development of metadata schema registries, and she has been in a partner in a number of related European projects (SCHEMAS I and II and CORES) that have investigated requirements and development paths. Within the UK Rachel has led the JISC IE Metadata Schema Registry project, which has now been funded within the JISC Shared Services Infrastructure strand of the Capital Programme. Rachel was instrumental in establishing the DCMI Registry, and has chaired the DCMI Registry Working Group over the last few years. Rachel has published and presented several papers related to schema registries, and presented on Terminology Registries at the NKOS workshop at DC2005. Recently Rachel co-authored the JISC Terminology Services and Technology review

**Traugott Koch** works as a Research Officer. He has carried out many digital library R&D projects during the last fifteen years at European, Nordic and national levels. His areas of special expertise are knowledge organization, terminologies and subject access, semantic interoperability, metadata and resource discovery and retrieval. He is involved in the development and maintenance of Dublin Core Metadata Initiative standards and is a member of the BSI BS 8723 Part 5 Standard Committee. He has published more than 60 scholarly papers, edited one book and five journal special issues. He is a co-author of the DELOS Semantic Interoperability report and the JISC Terminology Services and Technology review. Since the beginning, he is active in both the US and European NKOS network and organiser and committee member of many of its workshops and activities. He was invited expert in MODELS 11 and other related JISC workshops. Traugott is working in the IESR and eBank UK projects. He did create and maintain one of the first simple "registries" of online available KOS and controlled vocabularies.

### University of Glamorgan, Hypermedia Research Unit

The Hypermedia Research Unit (HRU) has been working in the area of Knowledge Organisation Systems from 1991

and is part of the Faculty of Advanced Technology, at the University of Glamorgan. The HRU is a member of the EC FP6 DELOS Network of Excellence on Digital Libraries and participates in activities within Cluster 5 on Knowledge Extraction and Semantic Interoperability. There are currently three full-time members of staff, two research fellows and several PhD students in the unit.

**Douglas Tudhope** is Reader in the Faculty of Advanced Technology, University of Glamorgan and leads the Hypermedia Research Unit. His area of research is Knowledge Organisation Systems and Services. He was PI on the EPSRC FACET project in collaboration with the Science Museum and Museum Documentation Association and is PI on a forthcoming AHRC project (STAR) in collaboration with English Heritage. He is Editor of the journal, New Review of Hypermedia and Multimedia and acting Theme Editor, Information Discovery, Journal of Digital Information (JoDI). He has co-organised 7 workshops on Networked Knowledge Organisation Systems/Services (NKOS) at ECDL, JCDL, DCMI conferences. He has over 50 refereed publications and was an author of the recent JISC State of the art review on Terminology Services and Technology.

## OCLC Office of Research

OCLC is a supporting, non-funded partner. OCLC Research is one of the world's leading centers devoted exclusively to the challenges facing libraries in a rapidly changing information technology environment. Since its beginning in 1978, the Office has investigated trends in technology and library practice to identify technological advances that will enhance the value of library services and improve the productivity of librarians and library users. OCLC Researchers are engaged in several projects involving terminology resources.  These include:

- Terminology Services project -- provides access to multiple terminologies as Web services.  The services are available as production services and as research prototypes.
- FAST – Faceted Application of Subject Terminology – A rich controlled vocabulary based on the terminology of Library of Congress Subject Headings (LCSH) that employs a simplified application syntax.

### Diane Vizine-Goetz

Diane Vizine-Goetz is lead researcher on the Terminology Services research project and is a member of the OCLC team conducting research involving the Functional Requirements for Bibliographic Records (FRBR) model. She has conducted research on the development of classifier-assistance tools and the application and use of the Library of Congress Subject Headings in online systems. She is a member of the FAST team

Professional Affiliations:

ASIS&T (American Society for Information Science & Technology)
- Classification Research

IFLA (The International Federation of Library Associations and Institutions)
- Functional Requirements for Subject Authority Records (FRSAR) working group

NKOS (Networked Knowledge Organization Systems/Services)
- Program committee, workshop

NISO (National Information Standards Organization)
- Thesaurus Revision Advisory Group

### Andrew Houghton

Andrew Houghton is lead developer on the Terminology Services Project and has made technical contributions to many OCLC projects, including WebDewey in Connexion®.  Andrews's research interests include classification schemes (enumerated, faceted and hierarchical), synonym rings, subject heading systems, thesauri, Web services and Service Oriented Architectures.

## 12. Budget

The proposed project budget has been constructed on a full economic cost (fEC) basis using the Transparent Approach to Costing (TRAC).

## 13. References

**Bargmeyer,** Bruce (2005). eXtended Metadata Registries (XMDR). Presentation at the 7th NKOS Workshop at JCDL 2005. http://nkos.slis.kent.edu/2005workshop/Bargmeyer.ppt

**Heery**, Rachel (2005). (Metadata and) Vocabulary Registries. Presentation at the NKOS Special Session at DC-2005. http://www.ukoln.ac.uk/terminology/events/NKOSatDC2005/NKOSatDC2005/heery-nkos-v2.ppt

**HILT:** Vocabulary resources. http://hilt.cdlr.strath.ac.uk/Sources/vocabulary.html

**ISO 11179**. http://metadata-standards.org/11179/

**Koch,** Traugott (1996-2005). Controlled vocabularies, thesauri and classification systems available in the WWW. http://www.lub.lu.se/metadata/subject-help.html

**Lee,** Ed (2004). Terminology resource discovery for the UK heritage sector – a case study. Presentation at the 3rd European NKOS Workshop. http://www2.db.dk/nkos-workshop/pp%20presentationer/NKOS-Ed.pdf

**Library and Archives Canada**: Classifications, Thesauri and Controlled Vocabularies. 1996- http://www.collectionscanada.ca/8/4/r4-280-e.html

**MARC Code List:** PART III: Classification Sources. http://www.loc.gov/marc/relators/relaclas.html

MARC Code List: PART IV: Term, Name, Title Sources. http://www.loc.gov/marc/relators/relasour.html

**NKOS** network. http://nkos.slis.kent.edu/

**NKOS Registry**. **Reference document for data elements.** Version 3, Draft, 14 June 2001 http://staff.oclc.org/~vizine/NKOS/Thesaurus_Registry_version3_rev.htm

**NKOS Registry, Version 2** with Documentation for Data Elements - Draft, 11/24/1998 http://nkos.slis.kent.edu/registry2.htm

**NSDL Registry**. http://metadataregistry.org/

**SPECTRUM Terminology Bank.** http://www.mda.org.uk/spectrum-terminology/termbank.htm

**Subject Analysis Systems** (SAS) Collection. Faculty of Information Studies Inforum Library, University of Toronto. http://www.fis.utoronto.ca/index.php?option=com_content&task=view&id=386&Itemid=134

The physical collection is catalogued and searchable in the University of Toronto Library Online Catalogue at: http://webcat.library.utoronto.ca/

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## Appendix B : FOI Withheld Information