

UK e-Science Core Programme and EPSRC

BRIEF OUTLINE:

Virtual Vellum is one of three demonstrator projects funded by the UK e-Science programme and Engineering and Physical Sciences Research Council to produce models that show how e-Science technologies can be applied to advance the understanding of complex research issues in the arts and humanities. e-Science in this context means the development and application of advanced technologies, or grid technologies, for research collaboration through the Internet, including particularly the sharing of digital and computing resources.

RESEARCH QUESTIONS

Arts and Humanities scholars working on international collaborative research projects involving large-scale image collections held on local and/or distributed databases often need to consult one another to explore questions of mutual interest (e.g. aspects of iconography, art-historical features, definition of image content, real-time comparison of similar or related images sometimes located at other remote sites).

The Access and Data Grids afford the ideal framework and computing power for rapid and efficient handling of such large-scale collections of high-resolution images, permitting real-time close-up scrutiny of single or juxtaposed

“Virtual Vellum: On-line Viewing Environment for the Grid and Live Audiences”

images, with independent zooming control and other functionalities such as hot-spotting, highlighting and blogging. Readily available generic tools for this kind of work do not yet exist. Their design and delivery to the research community poses a considerable but appealing challenge. A robust, customisable environment is needed for desktop working, compatible with different kinds of platform (Windows XP, Mac, Linux) and configured to address the particular needs of Arts and Humanities researchers.

Secondly, in all fields involving the image (e.g. manuscript studies, art history, iconography, cartography, theatre, museums and galleries), scholars presenting papers live at conferences or delivering online seminars that incorporate reference to the image (typically for side-by-side comparison) are still largely dependent on PowerPoint. Good as this product undoubtedly is, it is far from ideal for such presentations; once again what is missing is the active involvement of A&H scholars in the design process.

A more flexible, robust viewing environment is urgently needed, compatible with the platforms already mentioned, to allow scholars to present papers with confidence in a manner which allows them to manipulate their image files quickly, efficiently and flexibly, without having to sacrifice vital nuances of argumentation. The existence of such a tool might have the further benefit of encouraging scholars to use otherwise dormant datasets.

THE DEMONSTRATOR

From a prototype shown at the September 2005 e-Science “All_Hands” conference at Nottingham the project team will develop an online viewing tool and environment for use:

- by researchers whose collaborative projects involve multiple sites providing common access to large-volume, high-resolution image datasets (e.g. 2D images of manuscripts, 3D images of artefacts);
- during Access and Data Grid seminars or graduate workshops; and
- during live conference presentations, papers and lectures.

RESEARCH CONTEXT

Virtual Vellum arises from:

- (a) The Froissart Manuscripts Project (University of Sheffield, Dept of French and Humanities Research Institute, and curatorial and education partners at the Royal Armouries Museum, Leeds; the Dept of French, University of Liverpool, the Department of Art History, University of Illinois at Urbana-Champaign; the Department of History, Université de Pau et des Pays de l'Adour).

A 0.75 TB dataset of images has been derived from high-resolution digital surrogates of four complete early 15th-century illuminated manuscripts on vellum, housed in UK and French regional libraries. The corpus includes manuscripts held at Besançon and Toulouse Public Libraries, Stonyhurst College Library, the British Library, the Pierpont Morgan Library (New York), the Belgian Royal Library (Brussels) and the Bibliothèque nationale de France (Paris).

A six-month public exhibition of this manuscript material, to be shown alongside displays of contemporary arms and armour, is planned for the Royal Armouries Museum at Leeds (Oct 2007-March 2008), in partnership with

Demonstrator Projects in the Arts & Humanities

Curator of Arms and Armour Dr Karen Watts and her PhD student Ralph Moffatt. Liaison with Watts and Moffatt will involve discussions about the properties of the armour and weaponry displayed in the Froissart manuscripts' miniatures, and planning for the exhibition (supported by a Leverhulme Research Fellowship held by Ainsworth). Parts of the exhibition will ultimately be streamed to the Tower of London and Royal Armouries, KY, using the White Rose and WUN Grids. Innovative software for the Royal Armouries exhibition is being developed under the auspices of a DTI Knowledge Transfer Partnership awarded to Ainsworth and Tribal Technology (Sheffield) by DTI Research Associate Jessica Cauchard.

(b) The AHRC-funded Shahnama Project, University of Cambridge, Faculty of Oriental Studies. Comprises an extensive database of illustrated manuscripts of the Persian Book of Kings or “Shahnama” by Firdausi. Technical support is provided by the University's Centre for Applied Research in Educational Technologies (CARET). “Shahnama” has expressed the desire to collaborate with “Froissart” on the development of the online viewer and viewing environment, and to host a collaborative workshop on the subject. PI: Dr Charles Melville, Pembroke College, and Dr John Norman, Director of CARET.

(c) The AHRC-funded Christine de Pizan Queen's Manuscript Project (Edinburgh), which involves a collaborative partnership of scholars working on a British Library manuscript. PI: Professor James Laidlaw.

(d) The Worldwide Universities Network “Shrewsbury Book” Project (Illinois, Madison, York and Sheffield); an interdisciplinary consortium working on British Library Royal MS E 15.vi.

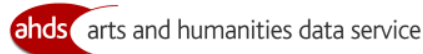
(e) The Native Indian Baskets Project, CITRIS program (University of California at Berkeley), which is developing tools for the annotation of image datasets and for online manipulation of images; they are also exploring 2D > 3D image extrusion, an activity of interest to “Froissart” for the purposes of the Royal Armouries Museum exhibition.



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PROJECT TEAM AND TECHNICAL SUPPORT ARRANGEMENTS

1. Professor Peter Ainsworth, Department of French, Leverhulme Research Fellow (PI)
2. The G6 Technician Associate
3. James Hall, holder of a White Rose PhD studentship in Artificial Intelligence and Computer Science. James is developing tools for a Grid-based SRB (storage broker resource) client and VLE for use by members of the White Rose and WUN "Reading the Medieval Book" research groups, under the joint supervision of Ainsworth (Medieval French: Sheffield), Romano (Computer Sciences & VR: Sheffield) and Kudenko (AI and Computer Sciences: York): "Bringing the Medieval Book to Life"

The demonstrator will be hosted within Hall's VLE. Workshops on the prototype software will be offered to the wider Arts and Humanities research community from Sheffield's Humanities Research Institute, in partnership with the UK's arts and humanities e-Science programme. A key part of AHeSSC's role is to liaise with and between the activities funded in this area by the AHRC and EPSRC (full list available at <http://www.ahrcict.rdg.ac.uk/activities/e-science/announcement.html>) It is intended that from the very beginning, A&H e-Science should develop as a coherent community, to maximize benefits to all stakeholders. An initial workshop with the other principal investigators is scheduled for 23 June in London (Professor David Robey). AHeSSC will have an ongoing relationship with the projects throughout their lifetimes.

Interest in Virtual Vellum has also been expressed by members of the HASS and CHASS networks (respectively at Irvine Ca. and Urbana-Champaign, ILL), and by Professor Reagan Moore (University of California at San Diego, Super-Computing Center, La Jolla), developer of the SRB client featuring in the project.

OUTPUTS AND OUTCOMES

- (a) The demonstrator: a fully manipulable and interactive online viewing environment for use on grid-supported and image-oriented research projects.

- (b) A customisable version of the viewing environment for use at conferences and in front of live audiences.

- (c) A facility for interactive use of (a) and (b) within real-time Access Grid and Data Grid seminars or conferences.

- (d) Functionality permitting authenticated access to image data by authorised research network members, including certificated graduate students, for research-related teaching purposes.

- (e) Demonstration and development in the context of associated A&H e-Science workshops.

- (f) Wiki for liaison with the JISC A & H e-Science Support Centre and broader research community.

- (g) Online and hard copy user manuals plus training materials.

- (h) From Autumn 2006, access grid workshops in partnership with "Shahnama" and other interested parties, e.g. Indonesian Manuscripts project, as part of a broader "Manuscripts and the Grid" programme, to roll out and showcase the viewer and its interactive functionality, and to demonstrate elements of Hall's VRE developed by that stage.

GRAND CHALLENGES FOR E-SCIENCE RESEARCH IN A & H ADDRESSED BY THE PROPOSAL

Use/potential of the Access and Data Grids and Web Functions

1. Use/potential of the proposed demonstrator for deployment within grid-based VREs or VLEs to host projects incorporating high-resolution, high-volume image datasets

2. Scoping/identifying the range of actual and potential disciplinary areas likely to benefit

3. Use of image datasets as test-beds for the exploration of image compression problems (e.g. JPEG 2000/JP2 open formats, and the emerging JPIP)

4. Functionality to include some support for authorised semantic mark up of images: the user would be taken directly to the semantically defined object in detail on an image; additionally, the viewer would be developed to enable a user to 'see' all the semantics behind an image, and to edit them.

5. Authenticated access to data by authorised research network members, including certificated graduate students, for research-related teaching purposes.

6. Facility for real-time Access and Data Grid manipulation of data within virtual seminars

AREAS WITHIN WHICH THE DEMONSTRATOR COULD BE DEPLOYED AND TESTED POST-PROJECT

Links to the AHRC ICT Programme's Armadillo data-mining project based at Sheffield's HRI (e.g. ontologies)

- Development of automated mechanisms to support remote distributed access to digitised datasets/databases by international and interdisciplinary research consortia (political and social history, art history and iconography, codicology and palaeography, cartography, literary history, language and literature, etc.)

- Testing of flexibility, scope and usefulness of METS and MODS metadata standards on large-scale high-resolution digital object collections (see AHRC Resource Enhancement bid for details of METS and MODS standards)

- Development of resources to link multi-media content semantically

- Public conferences in front of live audiences

PROJECT PI

Professor Peter Ainsworth, Director, Froissart Project (University of Sheffield)

PROJECT ADVISORY BOARD

Professor James Laidlaw, Christine de Pizan "Queen's MS" project (Edinburgh and British Library)

Professor Nigel Allinson, Electrical and Electronic Engineering (Sheffield; image compression)

Dr Charles Melville, Director, Shahnama Project (University of Cambridge)

Professor Reagan Moore, SuperComputer Center, La Jolla, University of California at San Diego (WUN partner institution)

PROJECT PARTNERS AND COLLABORATORS

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Anne D Hedeman (Art History, Urbana-Champaign)

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David Theo Goldberg, Director, Humanities Research Institute, University of California at Irvine

John Norman, Director, Centre for Applied Research in Educational Technologies (University of Cambridge)

Karen Watts, Senior Curator of Arms and Armour (Royal Armouries, Leeds and London)

Jan Graffius, Curator (Stonyhurst College Library, Lancashire)

Karine Rebmeister, Curator and Conservator (Besançon Public Library)

Jocelyne Deschaux, Director, Curator and Conservator (Toulouse Public Library)

Colin Dunn, Digitisation Consultant (Scriptura Ltd., Kidlington, Oxford)

Worldwide Universities Network (WUN) "Reading the Medieval Book" research consortium

White Rose Universities "Medieval Book" research network (Sheffield, York, Leeds)

Humanities Research Institute, University of Sheffield (Armadillo, e-Science workshops and other relevant projects).