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Putting Manuscripts on the Web

- Starts as an EPSRC demonstrator project
- Involving e-Science (digitisation and Grid)
- Partnerships with enlightened libraries
- Opportunity to exploit new technologies
- Scholar, photographer and curator…

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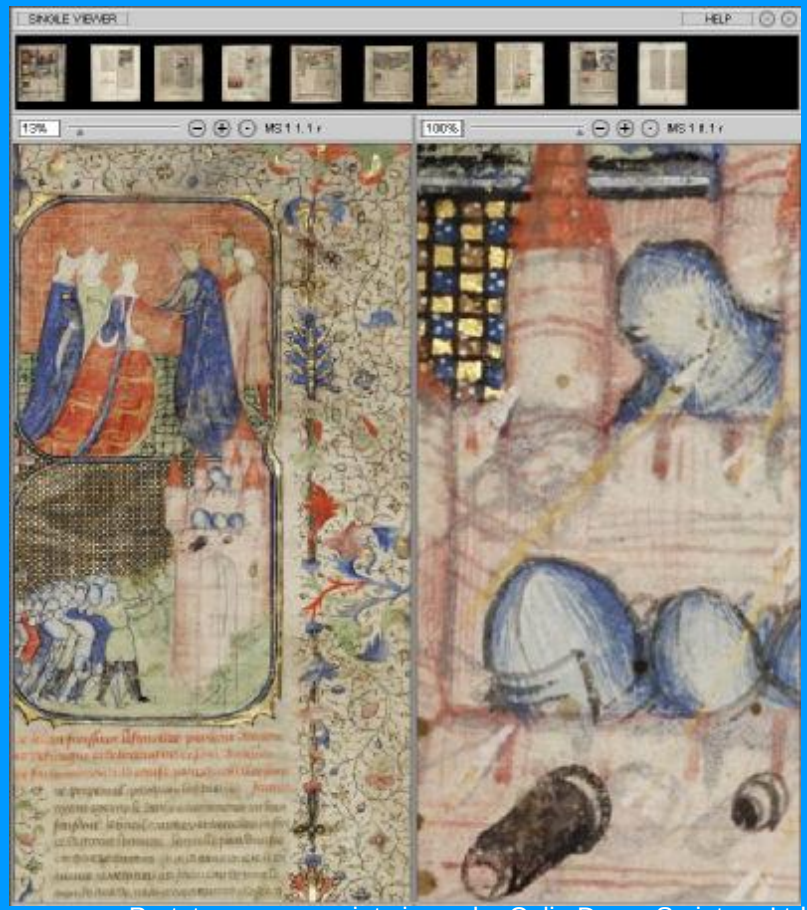
EPSRC Engineering and Physical Sciences Research Council

e-Science

Virtual Vellum

- funded by:
  - EPSRC/JISC Arts & Humanities e-Science Initiative
  - UK e-Science Core Programme
- generic viewing tools and environment for researchers to use with:
  - large-volume image datasets
  - high-resolution image files (> 8K x 6K pixels)
- delivered as:
  - open source & open standard
  - platform independent (Windows/Mac/Linux)
- allowing access to image datasets:
  - from laptop, PC or local hard drive
  - over the internet
  - over Data Grid, using Storage Resource Broker middleware
- useful for:
  - Access Grid seminars
  - live conference presentations and lectures



Prototype manuscript viewer by Colin Dunn, Scriptura Ltd
Images © Stonyhurst College, Lancashire and Scriptura Ltd

Virtual Vellum – project team

- PI: Peter Ainsworth, French and Humanities Research Institute, University of Sheffield
- Technician Associate, Michael Meredith, Computer Science, University of Sheffield
- White Rose Grid Development Officer, Mike Griffiths
- Imaging and Digitisation Consultant, Colin Dunn, Scriptura Ltd (Oxford)

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Libraries and Datasets

- Initial image datasets photographed by Colin Dunn (Scriptura Ltd.) and David Cooper at :
- Bibliothèque Municipale de Besançon
- Bibliothèque Municipale de Toulouse
- Stonyhurst College Library, Lancs (UK)
- Bibliothèque Royale Albert 1er, Brussels

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Partners and collaborators

- Anne D Hedeman, Professor of Medieval Art History at Illinois, Urbana-Champaign
- Christiane Raynaud, Professor of Medieval Iconography, Université d'Aix-Marseille
- Karen Watts, Senior Curator of Arms and Armour, Royal Armouries Museum
- Jan Graffius, Curator and Archivist, Stonyhurst College
- Karine Rebmeister, Curator and Conservator, Besançon
- Jocelyne Deschaux, Director, Curator and Conservator, Toulouse
- Charles Melville, Shahnama Project, Oriental Studies, University of Cambridge
- James Laidlaw, PI, Christine de Pizan Queen's Manuscript project, Dept of French, Univ. of Edinburgh
- Layamon Project, Graduate Centre for Medieval Studies, University of Reading !
- Worldwide Universities Network (WUN) "Reading the Medieval Book" consortium
- White Rose "Medieval Book" research network at Sheffield, York and Leeds
- Humanities Research Institutes, Universities of California at Irvine, and Illinois at Urbana-Champaign
- University of California at San Diego: Storage Resource Broker middleware

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Virtual Vellum – Technological Features

- Accesses images from:
  - local hard drive (laptop, PC, HD, or network drive)
  - over the web via HTTP and FTP
  - via Storage Resource Broker (SRB)
- Can be used:
  - in stand-alone mode for scholarly use or live presentation (single computer or laptop control)
  - collaboratively (during an Access Grid conference using multiple computer control, client-server support model)
- Can be run:
  - from your desktop or laptop
  - as a web-based Java applet
- Supports JPEG 2000 (JP2) and tiled JPEG image file standards

Project Web Site:
http://www.shef.ac.uk/hri/projects/projectpages/virtualvellum.html

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What can it show at present?

- Our corpus consists of six complete digitised manuscripts (4,126 images captured at 500 DPI, all converted to JP2 and uploaded to SRB and Virtual Vellum)
- Can be used to view generic image datasets
- Real-time zooming and panning of the images
- Fully customisable multiple image-view interface (you can compare multiple images side by side and manually position the image-view windows on your screen)

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What can Virtual Vellum do?

- Preview and navigate
- Display rulers and colour scales (optionally) over the image
- Address network bandwidth and efficiency issues when skipping between sections of a JP2 file, using optimal processing based on current network performance:
  - Skip and store (HTTP and FTP – traditionally a skip is a ‘skip and discard’)
  - Close and re-open a connection at the desired location (HTTP and FTP where supported by the web server)
  - Skip (SRB only)
- Cache tiles (only caches the most recently viewed tiles, to prevent incurring heavy memory loads)
- Use of multiple cores / threads for JP2 image decoding (each thread can concurrently decode a region of the image that is being viewed, improving system performance)

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It uses Java v 1.2 …

- Completely written in Java Version 1.2 (includes the JP2 decoder), though features that only appear in later Java versions (e.g. use of a mouse wheel) are also supported
- The complete Java implementation footprint is only 100KB (refers to the executable JAR file)
- Local caching of the image data means that data segments are read only once over a network (assuming that this data does not need to be discarded to make way for new data)

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Other features

- The application assumes that a limited amount of memory is available (typically an applet only allows 80MB of working memory), although this can be scaled up when running on a desktop
- Collator: a desktop application to convert TIFF/JPEG/BMP images to JP2, provide metadata about them and produce an XML catalogue file, all with minimal user effort
- Background network data caching: while the user is viewing an image from a local cache, extra image data is being pulled across the network and stored

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Virtual Vellum – JP2 vs. Tiled JPEG

- For each image there's just 1 JP2 file, whereas for the same image processed as a tiled JPEG there can be as many as 1,000 files – at twice the storage cost for the same image quality
- At low magnification (<15-20 % of original image size) and for 8,000 x 6,000 pixel images, JP2 files are less efficient at displaying an image than the tiled JPEG tiles, due to the overhead incurred between several hundred skips within a file to read only very small sections of data. With tiled JPEG files, multiple resolutions levels have been extracted and stored off-line for quick access (hence the large number of tiled JPEG files, requiring much more storage space)

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Where next?

- AHRC Resource Enhancement award, June 2007: the Online Froissart Edition
- EPSRC “Pegasus” project:

  Sharing the digitised surrogates over a data grid, as a resource for researchers, and for distributed virtual exhibitions

