



# THE WHITE ROSE GRID e-Science Centre

## Virtual Vellum and Kiosk

### Introduction

Virtual Vellum is one of three demonstrator projects funded by the UK e-Science programme and the Engineering and Physical Sciences Research Council to produce models to show how e-Science technologies can be applied to advance understanding of complex research issues in the arts and humanities. e-Science in this context means the development and application of advanced (especially grid) technologies for research collaboration via the Internet including in particular 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 or distributed databases often need to consult one another to explore questions of mutual interest (eg aspects of iconography or other art-historical features, definition of image content or real-time comparison of similar or related images whose originals are sometimes located at other remote sites).

Access and Data Grids offer the ideal framework and computing power for rapid and efficient handling of such large-scale collections of high-resolution images, permitting real-time and close-up scrutiny of single or juxtaposed images. Virtual Vellum has therefore been conceived with a core

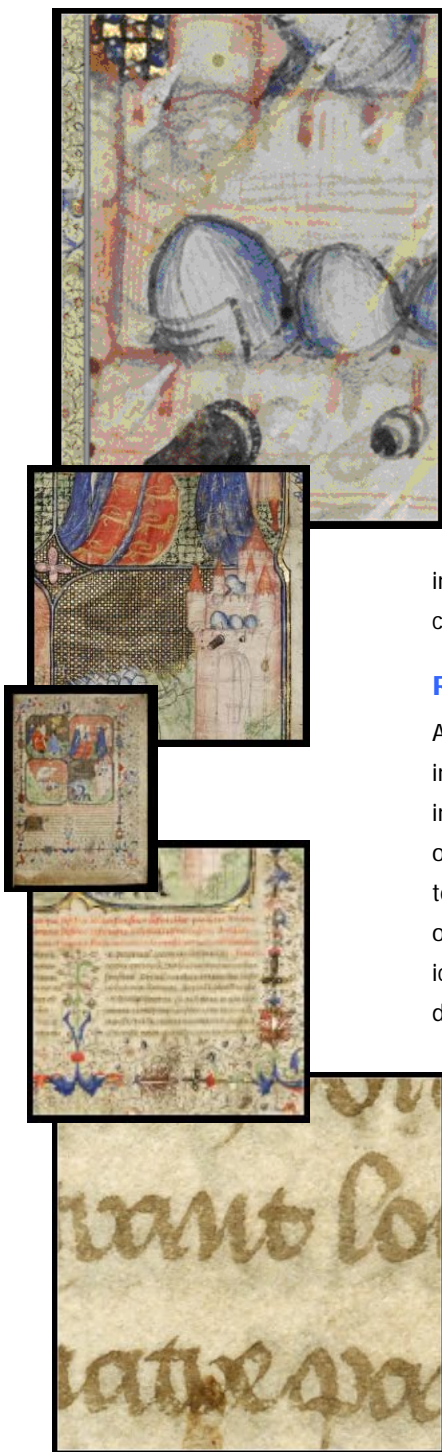
set of principles to deliver a flexible, robust viewing environment compatible with different platforms (Windows, Mac, Linux) to allow scholars to present papers with confidence in a manner which allows them to manipulate their image files quickly, efficiently and flexibly, and without having to sacrifice vital nuances of argumentation.

### The Demonstrator

Virtual Vellum enhances the techniques that are currently employed to display high-resolution images in real time, where image sizes are typically greater than 8K x 6K pixels. Areas of specific interest include the use of JPEG 2000, platform independence and the use of both Access and Data Grids.

### JPEG 2000

JPEG image compression is currently the predominant technique used for viewing high-resolution images in real time. This is partly due to its affording a noticeably smaller file size as compared to the raw image. However, high-resolution images can still take a considerable time to download over the internet. Many image viewing tools currently available resort to splitting the complete image into smaller fragments ("tiling"). This produces smaller JPEG file sizes but at the cost of requiring many JPEG files for a single, high-resolution image. When a user views an image, the software retrieves only the JPEG sub-images for the portion of the main image that is being displayed.





Viewing various folios of Besançon MSS 865 and 864 at different magnifications. Images © Bibliothèque Municipale de Besançon and Scriptura Ltd

**Access and Data Grids offer the ideal framework and computing power for rapid and efficient handling of large-scale collections of such high-resolution images, permitting real-time, close-up scrutiny of single or juxtaposed images, with independent zooming control and other functionalities ...**

The technique of fragmenting a single image into multiple JPEG images is, however, redundant with respect to pre-processing the data and storing it. JPEG 2000 presents an attractive alternative since it achieves the segmentation using a single file but without redundancy. Furthermore, at similar compression ratios the JPEG 2000 compression technique achieves better visual results than its JPEG counterpart.

Virtual Vellum embraces the enhancements that JPEG 2000 offers, and facilitates the real-time viewing of images that are encoded in such a format (datasets encoded using the JPEG tiling style are also supported).

### Platform Independence

Platform independence provides yet another facet to the demonstrator project, since it is written entirely in Java. Furthermore as the software is completely self-contained, it can be easily transferred between different computers without the need to copy or install additional library files that might otherwise be required.

### Using the Grids

The Froissart Project provides an initial set of images comprising six complete digitised manuscript surrogates. The image datasets are stored on and retrieved from a local hard drive, over the internet and via a Data Grid which uses Storage Resource Broker (SRB). The White Rose Grid and Worldwide Universities Network's WUN Grid provide our primary grid networks.

Virtual Vellum is equally adept at facilitating collaborative and stand-alone presentations of images to conference or lecture audiences. The demonstrator application is therefore ideally suited to

Access Grid environments where scholars wish to discuss the iconographic or art-historical details of such images.

### Kiosque

While Virtual Vellum is used more as a scholarly tool for accessing collections of images, a sister application called Kiosque provides a way of displaying and scripting image manipulation for presentational purposes. Kiosque has a fully customisable interface and allows text and sound to sit alongside the images that are delivered via Virtual Vellum as a plug-in. The software has been used to allow museum visitors to explore flexibly and interactively a set of Froissart manuscripts forming part of a public exhibition: this can either be narrative-driven or via free exploration, depending on a visitor's preference. Entitled "The Chronicles of Froissart", the exhibition opened at the Royal Armouries Museum, Leeds UK on 8 December 2007 for a four-month run; the content is now available online as a virtual exhibition as part of the Pegasus project, using an enhanced version of the Kiosque engine and underlying grid technologies (see Panoply web link below).

### Further Information

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Panoply Manuscript Collection Website:

<http://cbers.shef.ac.uk>

Virtual Vellum Project Website:

<http://www.shef.ac.uk/hri/projects/projectpages/virtualvellum.html>

Kiosque Project Website:

<http://www.shef.ac.uk/hri/projects/projectpages/kiosque/overview.html>

Kiosque: The main menu for the interactive Froissart Exhibition terminals

