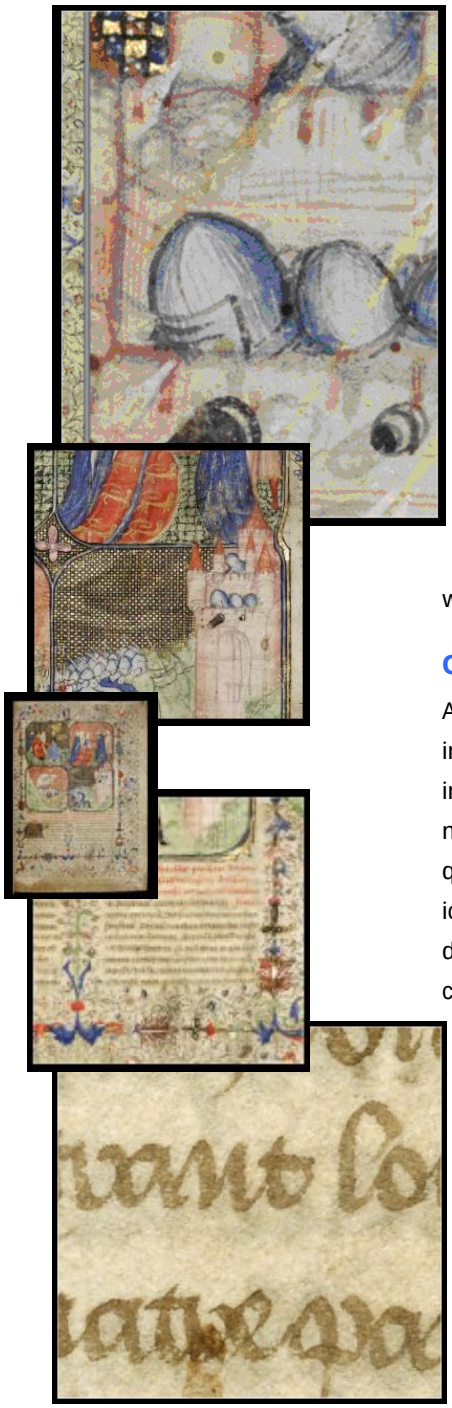
# Virtual Vellum and Kiosque



## Introduction

Virtual Vellum was funded by the UK e-Science programme and the EPSRC as a demonstrator project to show how e-Science technologies can be applied to complex research issues in the arts and humanities. e-Science in this context means the development and application of advanced technologies for research collaboration via the Internet including in particular the sharing of digital resources. Since the end of the funding period, Virtual Vellum has continued to develop beyond its original design and used within other research projects.

## Core Research Questions

Arts and Humanities scholars working on international collaborative research projects involving large-scale image collections often need to consult one another to explore questions of mutual interest (eg aspects of iconography or 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 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 to allow scholars to present papers 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

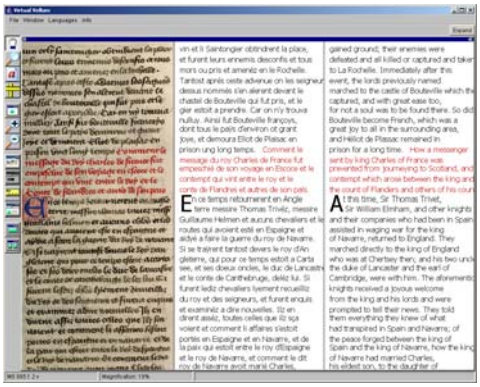
Virtual Vellum enhances the techniques that are currently employed to display high-resolution images in real time, where image sizes are typically greater than 8K x 6K pixels. Areas of specific interest include the use of JPEG 2000 and the use of both Access and Data Grids.

## 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. Many image viewing tools resort to splitting the complete image into smaller fragments (“tiling”). 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. The technique of tiling a single image into multiple JPEG images is, however, redundant with respect to pre-processing the data and storing it.

JPEG 2000 presents an alternative since it achieves the segmentation using a single file but without redundancy. Furthermore, at similar compression ratios JPEG 2000 achieves better visual results than JPEG.

Virtual Vellum embraces the JPEG 2000 enhancements, and facilitates the real-time viewing of images that are encoded in such



Synchronised viewing of image, transcription and translation of folio 2 v of Besançon manuscript 865. Images © Bibliothèque Municipale de Besançon and Scriptura Ltd

a format (datasets encoded using JPEG tiling are also supported).

## Using the Grids

The Froissart Project provided the initial set of images comprising six complete digitised manuscript surrogates; this has since grown to ten complete manuscripts. The image datasets can be stored on and retrieved from a local hard drive, over the internet (HTTP and FTP) and via a Data Grid using Storage Resource Broker (SRB). The White Rose Grid and Worldwide Universities Network's Grid provide our primary 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 images; during such sessions, multiple instances of Virtual Vellum connect to a central server which allows each participant to manipulate images in real-time with the changes quickly updated on other connected instances.

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

## Further Developments

Image analysis algorithms have been applied to all the images to automatically detect the page outline, column and line positions. Using this data, Virtual Vellum synchronises an XML-based transcription with an image; as one is manipulated (i.e. panned or zoomed) the other responds such that the lines of text are matched and sized appropriately. The text is automatically matched against the analysis data using the <lb> tags within the transcription and rendered on-the-fly. Pattern matching has also been applied between translations and transcriptions to insert pseudo line break tags which allow synchronised viewing of an image and its transcription and translation.

Virtual Vellum supports additional mark-up within the transcriptions and translation XML files which it uses as hotspots that the user can click to display prosopographical information.

Kiosque: The main menu for the interactive Froissart Exhibition terminals running at the Royal Armouries Museum, Leeds


## Kiosque

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: this can either be narrative-driven or via free exploration, depending on their preference. Entitled "The Chronicles of Froissart", the four-month public exhibition opened at the Royal Armouries Museum, Leeds on 8th December 2007 (the content is now available online as a virtual exhibition using the Pegasus infrastructure).

Kiosque is also being used at the Musée de l'Armée during an exhibition in March 2010.

## Further Information

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Virtual Vellum & Kiosque Project Website:
http://www.shef.ac.uk/hri/projects/{projectpages/virtualvellum.html}
{projectpages/kiosque/overview.html}

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