

Presenting a Monument in Restoration : The Saint Laurentius Church in Ename and Its Role in the Francia Media Heritage Initiative

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Figure 1 : From left to right : the Ename Museum, the TimeScope 2 outdoor kiosk and the Saint Laurentius Church

Abstract

Virtual Reality and multimedia technologies are central components of the heritage presentation programme at Ename, Belgium. These techniques are designed to help the visitor understand and experience the past as it has been revealed through archaeological and historical research. This paper briefly traces the development of multimedia and Virtual Reality technologies in presenting the archaeological site of the early medieval fortress and St. Salvator Abbey at Ename and in the archaeological exhibits in the Ename Provincial Museum. It then highlights the approach used in Ename to present the 10th-century Saint-Laurentius Church and its restoration to the public, describing the methodology of creating scientifically verifiable Virtual Reality reconstructions. In conclusion it

will place this project in the context of an international heritage initiative, the Francia Media Project, in which new interpretive technologies will be developed by members of a scientific consortium to offer new media of public heritage presentation in a European context.

1. Introduction

The Ename 974 Project, in coordination with the Ename Provincial Museum and the Ename Center for Public Archaeology and Heritage presentation, has concentrated in recent years on utilizing multimedia and Virtual reality as powerful tools to convey the significance and complexity of heritage to the general public. The major aim of the project is to communicate new insights about archaeology, history, and conservation to the general public with great

attention to scholarly accuracy and by means of multimedia technologies. Among the most important of these technologies are on-site virtual reconstructions, museum multimedia and educational projects. [1]

The current direction of research and experimentation at Ename seeks to integrate the various technologies into a more comprehensive program of interpretation in which multimedia and Virtual Reality will be seen not merely as attention-getting attractions, but effective communication tools for a wide range of material heritage sites and monuments.



Figure 2 : Ename with the Saint Laurentius Church in the foreground and the archaeological site in the background

First, a few words of general background. The village of Ename, where these projects are being undertaken, is located in Flanders, the Dutch-speaking area region of Belgium. More precisely, it is situated in the Province of East-Flanders, about 50 km west of Brussels, and 20 km south of Ghent, on the eastern bank of the River Scheldt, one of Belgium's two major rivers. The village is today a district of the city of Oudenaarde. Geographically, it is located in the Flemish Ardennes, a hilly region in southwestern Flanders. Its original historical importance springs from the fact that Ename is situated on the medieval boundary between the French Kingdom and the German Empire and is recorded in texts of the late 10th-early 11th centuries as being an important border stronghold and trade settlement of the Ottonian emperors.

The intensive archaeological and historical research carried out at Ename since 1982 has revealed the exceptional richness of its archaeological heritage in this and later periods. [2] Ename's ruins have preserved evidence of an early medieval fortress and trade settlement, which included a harbor, market, and crafts activity. As such it

offers an important glimpse at processes of urbanization and economic activity in northwestern Europe during a period in which most of its cities emerged. At a later stage of its history, Ename was the site of an important Benedictine abbey, whose construction, renovation, and eventual destruction at the end of the 18th century offers abundant archaeological data on monastic life.



Figure 3 : Ename in 1020 (same viewpoint as fig. 1) with the trade settlement and the keep in the background

2. On-Site Virtual Reality

During an early stage of the recent excavations at archaeological site of Ename, it was decided to place a major emphasis on public interpretation of the uncovered remains. Since most of the structural remains of the St. Salvator abbey were preserved only as foundations, the groundplan of the monastic complex—and, even more so, the original appearance of the standing structures—were extremely difficult for the non-specialist to recognize. This situation was by no means unique. Archaeological interpreters all over the world face a similarly difficult task in making complex and poorly preserved archaeological remains comprehensible to the general public. However impressive or picturesque archaeological remains may be, they are rarely recognizable as specific structures (such as houses, churches, or workshops) and they thus fail to capture the fascination of most visitors.

At first glimpse, visitors to Ename see a labyrinth of partially preserved architectural remains, which are the foundations of the Benedictine abbey that dominated life in Ename from 1063 to 1795. The remains of the early-medieval trade settlement (974-1050) are not visible, since they are for the most part covered by the remains of the abbey and in the relatively restricted areas uncovered,

consisted largely of soil layers and traces of decomposed wood that were removed in the process of excavation.

The Ename 974 Project therefore faced a double problem of making these remains intelligible to the visitors during the planning of its outdoor archaeological park. And in an attempt to avoid the interpretive and ethical problems of physical reconstruction, it was decided to offer visitors a picture of ancient life at Ename through Virtual Reality technology. A first prototype of a new VR technology, called TimeScope 1, was opened to the public on September 2, 1997.



Figure 4 : TimeScope 1 provides Augmented Reality

Through a touch-screen monitor installed in a large on-site kiosk, TimeScope 1 superimposes a 3D model of early medieval abbey churches over a real-time video shot of the exposed foundations, allowing visitors to see the successive structures as they appeared in their original state. [3] An accompanying multimedia presentation offers additional information about the site, its discovery, and the social and economic life of its medieval inhabitants.

3. Dynamic Landscapes and Artifact Contexts

The planning for the exhibits in the Ename Provincial Museum (opened to the public in September 1998) offered new opportunities for the use of multimedia in archaeological interpretation, particularly in the contextualization of exhibited archaeological artifacts.

Building on the experience gained in the 3D modeling for the on-site TimeScope 1 application, it was decided to combine a chronologically-arranged display of excavated artifacts with an interactive reconstruction of the historical landscape of Ename—clearly indicating to the visitors where each of the exhibited artifacts had been found. This application, named TimeLine, offers users the ability to move through time or to select a particular period of Ename's history to and to examine and learn more about contemporary artifacts.

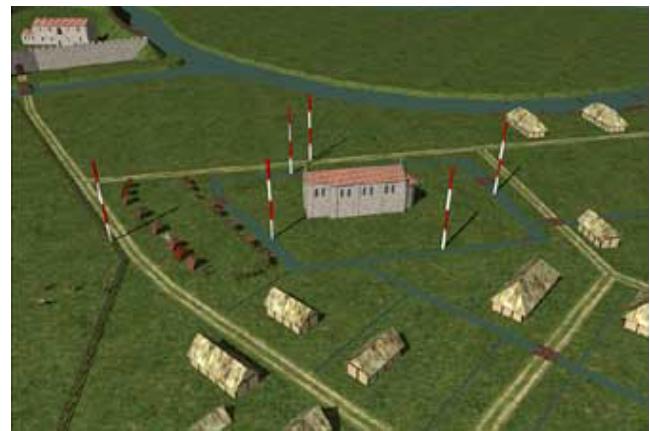


Figure 5 : the TimeLine application provides a VR context for finds

Its development led to a more complex application, called TimeTravel, that offers access to a database of archaeological and historical data on excavation results, written sources and historical iconography about Ename, through a custom-designed user interface. TimeTravel allows the user to explore Ename through the centuries, both from a bird's eye point of view as from an on the ground point of view.



Figure 6 : TimeTravel links historical sources to VR reconstructions

4. Architectural and Historical Discoveries

While the research at the archaeological site of Ename was planned as a large-scale undertaking, the study and analysis of the St. Laurentius Church in the center of the village initially came as the result of emergency restoration work. In 1990, as cracks appeared in the tower of the Saint-Laurentius Church, the archaeological team of the Institute for the Archaeological Heritage of the Flemish Community (IAP) headquartered at Ename was asked to conduct limited trial excavations around the church to check the foundations for problems of structural stability. The foundations were revealed to be sound, but the excavations revealed the presence of an earlier structure beneath the present church, thereby revising the commonly accepted history of this monument. [4]

Up to that time, the St. Laurentius Church had been identified as one of the many Romanesque churches constructed in Flanders in the 12th and 13th centuries. The sudden discovery of an earlier building phase, together with other architectural particularities discovered in the course of their investigation, inspired the Ename team to begin a long-range research project on the history of the church.

Important new evidence came to light with the removal of an 18th century vault (which was the probable cause of the stability problems of the church) and the discovery of an impressive arcade, revealing that the tower and eastern entrance had originally been a unique two-story choir. On the upper tympanum of this arcade, stunning frescos in Byzantine style were discovered, which were subsequently dated by C14 to around 1015 AD. Investigations in the west part of the church revealed a west choir with blind niches, very similar to examples in Ravenna and northern Italy in the 6th to 11th century, and to the architectural style and structure of the great imperial churches of the 10th and 11th centuries.



Figure 7 : The arcade with the Byzantine Majestas Domini fresco

These initial investigations suggested a completely unexpected historical situation: that the parish church of Ename was actually constructed around the year 1000 and

was contemporary with the early medieval fortress and trade settlement at the nearby archaeological site. Moreover, the architectural uniqueness and unusual splendor of the St. Laurentius Church brought forth the hypothesis that this church had been used around 1015 to celebrate a ceremonial coronation of the Holy Roman Emperor, whose realm reached at that time from Friesland to northern Italy. In this period, as mentioned above, Ename was one of the most important imperial border outposts on the west.



Figure 8 : Virtual reconstruction of the St. Laurentius Church in 1020

Based on these results and historical hypotheses, an intensive investigation and restoration project was begun in the St. Laurentius Church in 1999. The objectives of this project were not only to stabilise the eastern tower by restoring the original structure of the two-story eastern choir, but also to reveal the long-hidden double choir structure of the church and bring back the original pre-Romanesque style of the interior of the church by restoring the original plastering, floor level and entrances.

This restoration project was made possible by funding from the European Commission, which recognized the St. Laurentius Church as a unique and outstanding example of European architectural heritage.

5. Virtual Reality Interpretation of the St. Laurentius Church

This large scale project called for a significant new medium of public interpretation, especially because the St. Laurentius Church would be closed to its congregation—and to the general public—during the restoration works. It would be necessary not only to interpret the history of the structure to passersby and visitors, but also to provide glimpses of the work-in-progress, and “virtual” views of the appearance of the interior before restoration and of its expected appearance at the end of the project.

The multimedia application developed for this purpose, called TimeScope 2, expanded on the earlier technological experimentation at the archaeological park and in the museum and consisted of outdoor and indoor kiosks and a website. This new system was obviously quite different from the first TimeScope system, as it highlighted a standing monument, rather than exposed archaeological

remains. It permits visitors to monitor the progress of the excavations and restoration work. An accompanying multimedia presentation highlights the historical importance of the church and explains the rationale and stages of the restoration project.

TimeScope 2 consists of 3 subsystems : an outdoor kiosk, an indoor interactive system and an Internet site. All systems provide historical background on the church and allow follow up of the excavation and restoration works through "News from the Past". In this way, museum visitors can explore the history and meaning of the church in an optimal way, and discover how the ongoing excavations and investigations of the building have provided the information for a new understanding of its historical and architectural significance. Passersby or inhabitants of Ename can check quickly the status of the restoration works and view the progress of the work in the interior of the church from the vantage point of a camera mounted inside. And even those Internet viewers who cannot personally visit Ename can learn about the St. Laurentius restoration project through the Time Scope 2 website which features the multimedia presentation, "News from the Past," and regularly updated stills from the interior camera.

In terms of hardware, the outdoor kiosk consists of an obelisk in copper, containing a primary high brightness touchscreen supplemented by two additional high brightness screens to accommodate larger groups of visitors. All hardware is weather proof and vandalism-resistant. Another factor enhancing the security and maintenance of the outdoor system is that its computer is located within the museum and connected to the kiosk through a high-speed network link. In terms of content, the outdoor program is video based and consists of a shorter version of the indoor multimedia presentation, with the addition of regularly updated items from "News from the Past."



Figure 9 : The indoor component of TimeScope 2

The indoor interactive system is operated through a waist-level touchscreen podium, with a large projection screen positioned above it to accommodate groups of up to 50

visitors. The video-based content includes a 10-minute interactive documentary on the discovery of significance of church as well as the full list of "News from the Past" items.

Both systems have open software structure, based upon industry standards HTML and MPEG-2, featuring the extensive use of VR, combined with video footage of the excavations in progress and introductory and explanatory sequences with actor-presenters. An important element is the extensive use of QuickTime VR panoramas for exploration of virtual environments [5].

Figure 10 : A page from "News from the Past"

The "News from the Past" feature, already a part of the Ename 974 website (<http://www.ename974.org/>), offers worldwide access to the excavations and the ongoing restoration works that are expected to continue to the spring of 2004. So far, approximately 150 update pages on the archaeology and the restoration work have been posted, offering the general public a unique glimpse into the activity in the temporarily closed restoration area. And more than being merely a sequence of news updates, this feature has been written to include several ongoing "story line" – connected through hyperlinks - in which important research questions have been raised—and sometimes resolved—and yet new questions raised during the course of the work. In several cases VR reconstructions have served to clarify the nature of the problems faced by the research team. Older items get thematically organised in an archive with an effective and simple content indexing mechanism.

Website page hit statistics have indicated a steady increase of viewership since the inception of "News from the Past" in 1999. The constant updating of this feature stimulates return visits for those who enjoy closely following the progress of the work : more than 25 % of the website visitors return within the month, with "News from the Past"

pages always showing up in the list of most frequented pages.

In the meantime, “News from the Past” has been started for four other excavation sites of the Ename team. Three of these sites are situated within city centers, and received a lot of interest from the local citizens and local press.



Figure 11 : A camera image from “News from the Past” showing the excavations within the Saint Laurentius Church

Traditionally, archaeology and restoration are very closed : the public sees the results only years after the works or excavations started. We experienced that a significant interest exists to follow the archaeologist in his search for the past, and to stand next to the restoration worker who recreates the former splendor of a building, probably because a lot of people feel connected with the subject : it is their church, their city, their ancestors.

Although originally conceived as a temporary application to provide information and virtual access to the closed church structure during the restoration project, TimeScope 2 will evolve into a permanent inside system at the conclusion of the restoration work. It will be installed inside the church in the west choir and will offer visitors (from an inconspicuous and respectfully designed kiosk) information about the history of the church and how it appeared before and during the restoration. The Charter of Venice forbids to wipe out one part of the history of a building in favour of another part of its history. Here, the former appearance of the church will be preserved, but in a virtual way.

6. Virtual Reconstructions

An important part of the VR efforts at Ename are based upon virtual reconstructions of historical buildings and landscapes. Based upon several years of experience, the Ename team has established a methodology to produce virtual reconstructions in such a way that they can be validated scientifically and thus have a high probability of accurately simulating the major aspects of a structure’s ancient appearance.

This methodology is based upon a detailed and systematic analysis of the remains, not only from an archaeological and historical standpoint but also from close analysis of the building materials, structural engineering criteria and architectural aspects as well. Together with written sources and iconography, this data is used to produce a virtual reconstruction which fits optimally with the data and its presumed use. To find this optimal solution, several hypotheses are checked against the results and data, and 3D models are “iterated” towards the most probable solution. [6]

For a project like “News from the Past”, this analysis is done each time new data becomes available, so that the 3D model remains up to date with the investigations. These models have proven to be of significant importance, to support decisions in the restoration process, and to steer investigations in an active way. Hypotheses about the building history are derived from the 3D models and result in targeted probing of specific parts of the building to check the hypothesis. As a result, all 3D models in the Ename 974 project have also a fourth dimension : time. We try to capture the evolution of a building or landscape as precise as possible, in order to link this to other evidence about political, economical or environmental changes.

7. The Francia Media Heritage Initiative

In the spring of 2004, the restoration of the St. Laurentius Church will be completed and the TimeScope 2 installation will be adapted for use within the church structure itself. With this, a major phase of the technological development work of the Ename Project will have been concluded. Yet the public reopening of the restored monument and its associated multimedia interpretation technologies offers an opportunity to cooperate with the professionals and scholars at other significant sites to create a dramatically new kind of heritage initiative.

The Ename Project has shown that it is possible to combine archaeological research, multimedia presentation technologies, and community development into a single long-term enterprise. The aspect of community development is especially crucial, as an increasing proportion of funding sources for cultural heritage projects comes from public funds—in which educational and communication aspects are often central elements.

The theme chosen for an initial pilot project in Europe is “*Francia Media*,” recalling the brief historical moment more than 1000 years ago, that cultures, economies, societies, and social values of a narrow strip of Europe stretching from the North Sea to the Italian peninsula were deeply and profoundly intertwined. “*Francia Media*” possessed a unique spirit of independence in the midst of conflict, while also playing a role as one of Europe’s most important mediators of economics, culture, and technology.

Roughly spanning the 8th-11th centuries, this “middle realm” was united in a courtly culture in which art, military

technology, religion, and economic arrangements flowed freely among its various cities and regions. Ename was an important settlement at the border of this region in the 10th and 11th century.

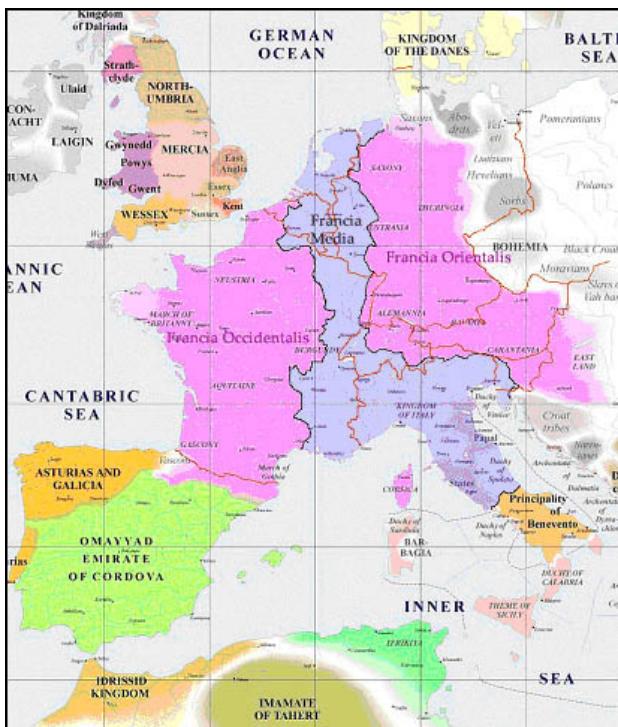


Figure 12 : Europe after the Treaty of Verdun (843). Map courtesy of <http://www.euratlas.com>

The **FRANCIA MEDIA PROJECT** seeks, therefore, to stimulate scientific research, advanced heritage presentation, and a wide range of cultural events throughout the historical core of Francia Media (Netherlands, Belgium, Luxembourg, France, Germany, Switzerland, and Italy) to study, commemorate, communicate, develop, and preserve this rich European legacy.

8. Proposed Components of the FRANCIA MEDIA Project

The **FRANCIA MEDIA Project** will combine the goals of scholarship, heritage preservation, and local economic development. It will utilize the advanced multimedia presentation techniques of Ename together with the scientific, architectural, communications, and management expertise of the other consortium partners to create a comprehensive cultural project.

It is hoped that this multi-disciplinary framework can serve as a model for other multi-cultural heritage presentation projects that seek to stress both the universal and the local values of historical patrimony. The planned activities include:

- An **international multimedia exhibit** to open in Spring 2004 in East-Flanders and travel to other

venues throughout Francia Media. The use of “Virtual Exhibits” will permit the simultaneous opening at other sites. This exhibition will highlight the shared heritage of Francia Media and will place its emphasis not only on spectacular elite cultures and artifacts, but also on social life in every stratum of society. A highlight of this exhibit will be the use of innovative multimedia and Virtual Reality applications to bring to life the society and culture of the regions and cities Francia Media in their various historical periods.

- Establishment of a select **international scientific committee** and academic working group to cooperate in the formulation of new historic approaches to the history of Francia Media—both for the development of exhibition content and for the general historical and archaeological study of the period.
- Establishment of select **international technology working group** to develop and implement new heritage presentation technologies (i.e. interactive Internet access, Virtual Environments, Simulated landscapes, Customized visitor content through the use of SmartCards, etc.) to be presented as pilot projects for the 2004 exhibition—and will also serve for continuing practical development of heritage presentation technologies all over Europe.
- **Special cultural events in cities and regions of Francia Media** during 2004 to commemorate and celebrate main themes and monuments of this historical period: i.e. special tours and monument openings, educational programs, artistic performances, lectures, concerts, etc. Thematic cultural routes to lead visitors throughout the region (and to attend the special events) will be established and widely publicized.
- **Cultural Tourism Itinerary through Francia Media** will link and promote the special events in all the consortium cities and regions. This route will offer visitors information on the history of the various roads and trade routes that crossed this region as well as highlight special events at the historic sites along its course. An website and special publications will also offer practical touristic information.
- **Heritage planning initiatives** in the key cities, regions, and sites of Francia Media Project to improve the living interaction between historic districts and the modern development of the surrounding urban area. These activities will be conducted by consortia of scholars, administrators, and town planners in each of the member countries.
- **International seminars and workshops** of academics, government officials, and heritage professionals under the auspices of ICOMOS to

establish standards of practice and to formulate coherent cultural preservation and presentation policy in the region of Francia Media for the coming years.

9. Conclusion

Despite the technological developments of recent years, the use of multimedia and virtual reality at historical and archaeological sites is still in its early stages. The Ename 974 Project has embarked on a program of development that encompasses the use of these technologies in a variety of settings: archaeological site, museum, and standing monument. The latest of the applications, TimeScope 2, offers a flexible system of public interpretation both to on-site visitors and remote viewers, via the internet.

The next stage planned for the enhancement of these interpretive technologies is the construction of a consortium of development sites, focused on a common cultural theme. This pilot project will seek to test the applicability of the earlier technologies in a wide range of environments and will experiment with increasing the sophistication of public interpretation by linking a network of culturally and historically-related sites.

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The Ename Center for Public Archaeology and Heritage Presentation is directed by Dirk Callebaut. Daniel Pletinckx and Neil Silberman are responsible for New Technologies and Heritage Interpretation respectively. The goal of the Ename Center is to develop new technologies and standards for heritage presentation. It also coordinates heritage presentation projects and educational programs for partner sites around the world (<http://www.enamecenter.org>).

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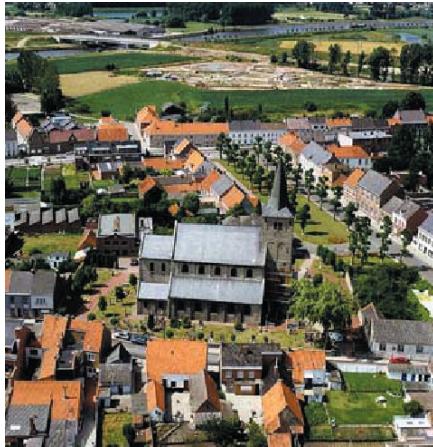
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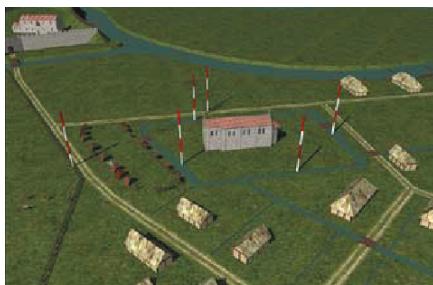
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