

THE LEMO PROJECT -  
DEVELOPING A VIRTUAL EXHIBITION OF 20<sup>TH</sup> CENTURY GERMAN HISTORY

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## 1. Introduction

Cultural institutions are among those now making increasing use of the World Wide Web as a medium for information services. Many museums use the WWW to publicize exhibitions or to show items from their collections. However, most of these presentations consist of little more than scanned photographs with accompanying text.

The LeMO project ('Lebendiges virtuelles Museum Online', dynamic virtual museum online) is adding a new dimension to the Internet presence of two historical museums ([www.dhm.de/lemo](http://www.dhm.de/lemo) or [www.hdg.de/lemo](http://www.hdg.de/lemo) or [www.isst.fhg.de/~lemo](http://www.isst.fhg.de/~lemo)). In cooperation with the Fraunhofer Institute for Software and Systems Engineering ISST, the German Historical Museum (DHM) in Berlin and the Haus der Geschichte of the Federal Republic of Germany (HdG) in Bonn are developing multimedia applications for the Internet. LeMO is a project of the DFN Verein (Association for the Promotion of a German Research Network) and in the year 1997-1998 it received funding from the Deutsche Telekom Berkom GmbH. Visitors are offered both a textual and an intuitive approach to history. Three-dimensional environments designed using the VRML programming language (Virtual Reality Modeling Language) form a virtual tour through 20th century German history: animations and museum exhibits (images, graphics, photos, historical artifacts, audio documents) combine to give a many-facetted picture of German history. By clicking on the individual objects displayed, users can open windows containing additional multimedia HTML pages. These pages give information on individual historical periods and topics, chronicles and biographies, supplemented by film and sound recordings. Both access to the virtual exhibition and browsing of additional information are possible either via conventional HTML pages or three-dimensional VRML environments.

In the follow-up project LeMO+, the functionality of the virtual exhibition is to be extended. Users are to be offered a metadata-based search machine and the use of LeMO is to be tested in schools.

LeMO is a joint project involving computer scientists, historians and designers. This means that in addition to the technical and content requirements, key issues arise in the course of the conceptual and design process. This close cooperation between different disciplines is a special feature of the project.

## 2. Designing Content and Representing Historical Periods

In the virtual exhibition, 20<sup>th</sup> century German history is broken down into nine distinct periods:

- **Wilhelmine Germany (1900-1914)**  
1900 is given merely as a rough starting date, as it doesn't correspond to any specific historical event. As there is a separate section on the First World War, this period ends in 1914.
- **First World War (1914-1918)**
- **Weimar Republic (1918-1933)**  
This period is divided into three phases:
  - revolution and roots of the republic (1918/19-1923)
  - stabilization (1923-1929)
  - crisis and end of the Weimar Republic (1929-1933)
- **National Socialist Regime (1933-1939)**  
This period begins on the day the National Socialists came to power, January 30<sup>th</sup> 1933.
- **Second World War and Holocaust (1939-1945)**

As for the other sections, the periods after 1945 deal with the history of Germany as a whole. The Federal Republic and the Democratic Republic were not divided into two separate sections, since the history of one German state is inconceivable without the other.

The German question is a central issue of the years between 1945 and 1990, with the historical dividing lines 1949, 1989 and reunification on October 3<sup>rd</sup> 1990. These dates shape the corresponding periods in the exhibition:

- **Post War Years (1945-1949)**  
Ending with the founding of the Federal Republic and the GDR
- **Divided Germany (1949-1989)**  
Deals with the entire period during which Germany was divided. For better orientation, this period is divided into four sub-periods:
  - reconstruction in east and west (1949-1955)
  - high point of the cold war (1955-1963)
  - continuity and change (1963-1974)
  - new challenges (1974-1989)
- **German Unification (1989/90)**  
Deals with the developments in the East leading to change in many countries including Germany, focuses on the altered situation in East Germany after the fall of the wall, and shows the stages which eventually led to the reunification agreement.
- **Paths into the Present (since 1990)**  
Gives an outlook on the present and the future of unified Germany.

The same breakdown applies to HTML pages and VRML environments alike. In this way, a general overview is offered in addition to more detailed information, encouraging an understanding of the century's history from different perspectives. The DHM covers the periods from the turn of the century to the end of the Second World War, the HdG covers the remaining periods through to the present day.

LeMO offers users a choice between two different types of access: while VRML allows historical objects to be related to one another in space, HTML pages are used to provide illustrated information texts, digitized videos and sounds, supplementary biographies and chronicles. To optimize navigation, the HTML pages are all based on a uniform layout standard. At the more detailed level, the VRML environments have very different architectures, giving a characteristic representation of each period.

To implement the various periods as VRML environments, an overall concept was developed for LeMO consisting of a set of geometrical figures which are combined in various ways to symbolize the different periods. These abstract symbols are situated in a "time tunnel" with direct access to the various periods.

The presentation for the period of Wilhelmine Germany resembles a real museum. A bust of Kaiser Wilhelm II stands in the center of the octagonal room. Around him – on pedestals and on the walls – historical objects are presented relating to subjects such as home and foreign policy, everyday life, etc. The room contains a pavilion showing art of the period. Through the wall directly opposite the entrance, visitors can catch a virtual glimpse of the environment dealing with the First World War.

In his novel "All Quiet on the Western Front", Erich Maria Remarque writes, "The front is a cage". The architecture for the environment dealing with the First World War – a room with barred walls – is a visual interpretation of this quotation (see Figure 1). The resulting niches are used in three ways: as frames for war photographs, as background for key words and as doors to other environments dealing in detail with subjects such as art, everyday life and war propaganda.

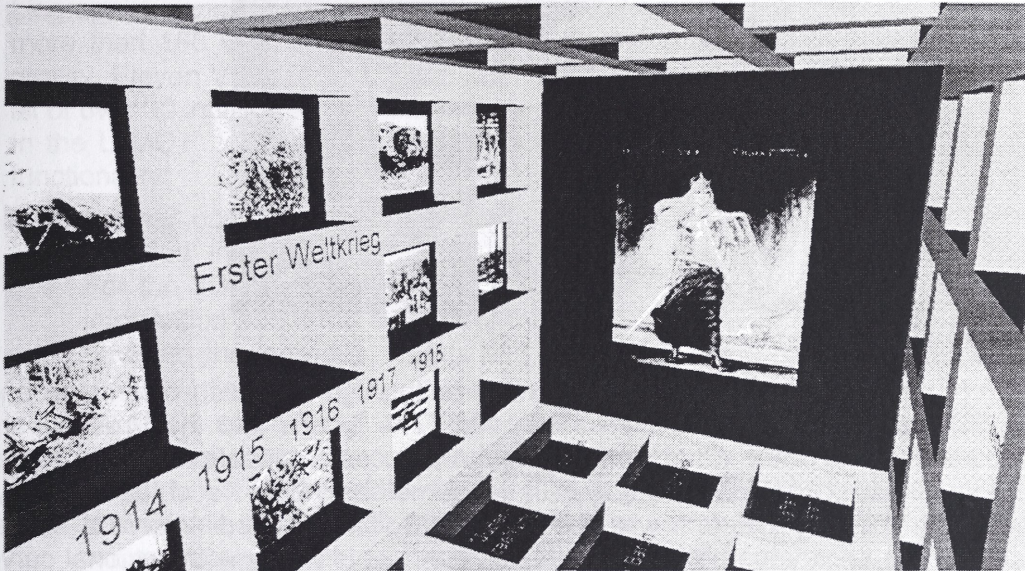


Figure 1: Three-dimensional cage room for the period "First World War"

The period of the Weimar Republic is portrayed as "a world of building blocks". Simple geometrical forms are combined in an environment where each shape belongs to a specific topic. Beginning with the revolution of 1918/19, symbolized by chaotically scattered cubes which obstruct the view, visitors move into a more ordered environment symbolizing the National Assembly of 1919. In the phase of stabilization, the environment is increasingly colorful with more different shapes. Visitors pass through a city of cones, pillars, pyramids etc. providing information on topics including everyday life, science and research, and industry.

The three dimensional schematic interpretation of the 1919 constitution offers additional details of domestic issues. A virtual book shop offers access to literature of the period.

Whereas the environments dealing with the Weimar Republic use the German black-red-gold tricolor flag as their background, the swastika flag is used for the National Socialist period. This environment is a three-dimensional room in which visitors can move about, but there is no way of getting an overview, the visitor is always within. The black swastika is used to exhibit items from the NS regime. The white circle contains elements relating to resistance and exile. And the red surrounding area deals with the reaction from abroad.

The design for the period rooms covering the Second World War and the Holocaust will either be very closely related to that of the NS Regime or actually embedded within it.

The period of the "Post War Years" consists of stylized architectural elements arranged in an empty landscape.

Due to its size, the "Divided Germany" period is broken down into four sub-periods. The years of "Reconstruction" are symbolized by scaffolding, the "Cold War" by anti-tank barricades, "Continuity

and Change" is symbolized by a version of Escher's staircase (see Figure 2) and the "New Challenges" section is grouped around a structure resembling a launch pad.

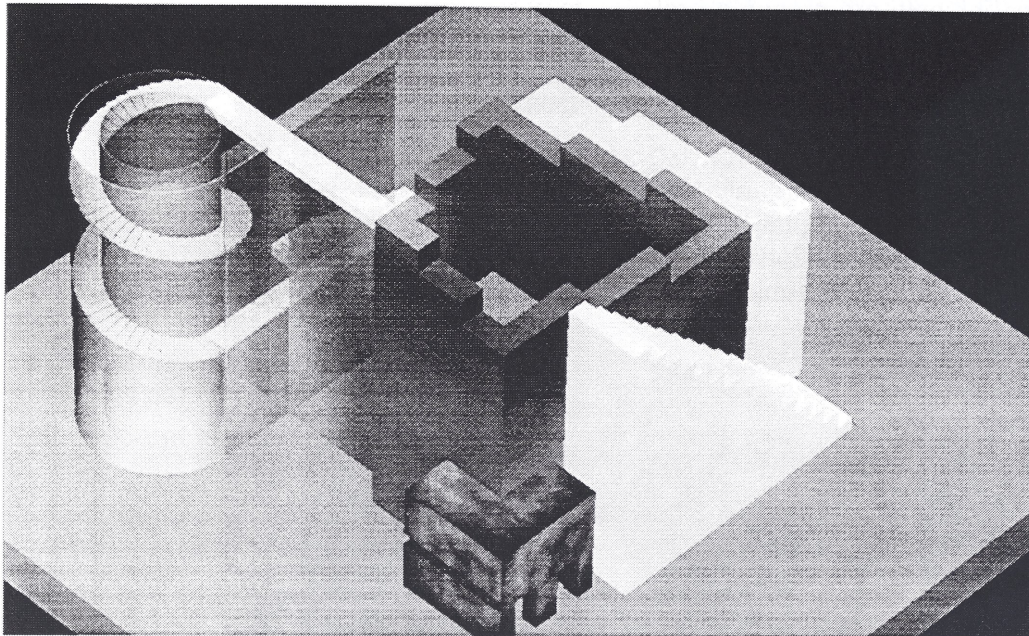


Figure 2: Escher staircase for the period of "Continuity and Change"

In the environment representing "German Unity", visitors pass through a divided colonnade and then break through the wall to enter a round, columned hall. The "Paths into the Present" are organized round a rotating model of the world symbolizing the process of globalization. For easier understanding, individual fields occurring repeatedly with the same basic form - such as economy, culture and the process of coming to terms with the National Socialist period – have a similar design in each case. For the economy, the common design element is a three-dimensional curve representing a comparison of fluctuations in industrial production per capita between east and west for the period in question. For the process of dealing with Nazi history, a walk-in cube with dark metallic surfaces is used. And for culture, the design is based on a representative painting or poster, combined with a building typical of the period, such as a makeshift theatre for the post-war years or a 1950s cinema.

### 3. Technical Basis and Systems Architecture

The LeMO project is based exclusively on Internet technologies<sup>1</sup>. This ensures that anyone with Internet/WWW access can take a virtual walk through history. What makes LeMO special is the combination and integration of a wide variety of multimedia web technologies to form an Internet information system. The following components were used:

- Virtual Reality Modeling Language (VRML) for 3D environments,
- HTML, Javascript and Java for web pages
- streaming audio/video for real-time data transfer to the user to avoid excessive download times.

On the network side, the LeMO architecture is based on the DFN-Verein's high bandwidth network B-WiN with a maximum transfer capacity of 155 MBit/s and access to further networks. The LeMO architecture therefore consists of components which support broadband users as well as those with low bandwidth network access. Some of the VRML environments were designed specially for B-WiN, resulting in long download times for users connected via ISDN or modem.

<sup>1</sup> Lutz Nentwig, Sonia Manhart, Andreas Kampa, Andreas Wendt, Dr. Burkhard Asmuss, Wolfgang Röhrig, Thomas Schneemelcher, *Bringing Museums to the Web: An Architecture for a Virtual Exhibition*, Inet'98, Geneva, 21 – 24 July 1998, <http://www.isst.fhg.de/~lemo/inet/index.htm>

On the user side, the system requirements are a multimedia computer with Internet access with a WWW browser running as a client application. By installing freely available plug-ins<sup>2</sup>, a WWW browser can be used to navigate VRML environments and receive streaming audio/video. Users whose computers are too slow to visit the 3D exhibition rooms can always view the HTML pages with sound and video material, which is no problem even at a data transfer rate of 28 KBit/s.

#### 4. Summary and Outlook

In two years of project work, LeMO has developed into a comprehensive multimedia information system. LeMO was officially launched and went online in January 1999<sup>3</sup>.

To date, over 4000 HTML pages have been created including over 1000 texts on individual periods, general topics and specific subjects, over 2500 images with accompanying text, over 700 biographies, and 99 chronicles. In addition, over 100 sound documents have been digitized and more than 160 videos have been stored on the LeMO server, each at three different levels of quality. Eleven VRML worlds have been developed for the various historical periods, consisting in all of over 30 individual VRML environments.

In the LeMO+<sup>4</sup> follow-up project, this information system is being extended to include additional functionality:

- Further content and functionality is being added to the LeMO system to make it a "well rounded" information system offering a range of options for accessing German history. For the 3D environments, spoken "Guided Tours" have been developed, providing general information about the content of the rooms in question. The guide also gives tips for how to navigate the individual worlds and where and how access can be gained to other areas of the exhibition (e.g. rooms dealing with other themes or periods). A LeMO+ search engine is being developed to help visitors access specific information within the virtual exhibition. For all searchable objects, brief descriptions are prepared ("meta-data"), which enable detailed searches to be carried out for more accurate results than a full-text search of all LeMO web pages with a search engine such as AltaVista or Yahoo. This will eventually result in a meta-database of LeMO content.
- It is hoped that LeMO+ users will participate actively in debate on German history. To encourage this, various interactive applications are being developed, from a questionnaire on German history through to the creation of a "collective memory", where visitors can contribute experiences, interviews and even their life stories.
- To make LeMO+ particularly useful for schools, cooperative projects are to take place with selected schools in Berlin and Bonn. In close cooperation with teaching staff, the use of LeMO+ in lessons will be tested. In addition, pupils are to help fill the interactive applications with content either in regular school time or as part of extracurricular activities. During its pilot phase, the "collective memory" will be accessible to schools only.

LeMO+ makes "experiencing history" possible in a new medium. Representative objects and imaginative design combine to offer a trip through 100 years of German history. The complexity and quality of this virtual exhibition make it the only one of its kind in the Internet. This virtual world is not intended as a substitute for real exhibitions, but rather as an appetizer for visits to museums. Instead of imitating reality, the project team have succeeded in their aim of exploiting the full potential of the Web as a medium to develop a new form of exhibition.

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<sup>2</sup> Plug-In for VRML: Cosmo Player, Plug-In für Video/Audio: RealPlayer

<sup>3</sup> <http://www.dhm.de/lemo> or <http://www.hdg.de/lemo>

<sup>4</sup> LeMO+ is funded through the DFN-Verein with financial support from the German Federal Ministry for Education and Research (BMBF).