



Almost nine months of intensive work was required to digitally restore the Lienzo de Quauhquechollan to its original appearance by eliminating stains and blurs.



The lienzo was worn; faded; discolored; and, in places, torn. Identifying locations and deciphering the pictographs were difficult, but trying to physically repair the map's fragile cloth would likely damage it.

Web Map as Time Machine

An ancient story of conquest is heard again

By Monica Pratt, ArcUser Editor

Lienzos are maps that tell the story of a place. The story of the *Lienzo de Quauhquechollan*, one of the oldest of these maps, is being told on the Web 500 years after the events it records occurred. A responsive and intuitive Web site developed by the Universidad Francisco Marroquín (UFM) and Geosistemas y Tecnología Avanzada, S.A. (Geosistec), ESRI's distributor in Guatemala, using the recently implemented ArcGIS API for Microsoft Silverlight, has made sharing this cartographic treasure with potentially millions around the world possible.

The Original Multimedia Experience

For the peoples of Mesoamerica, place and past were inseparable. Lienzos not only recorded the details of a geographic location but also communicated what happened there in a form of mapping now described as historical cartography. Graphic symbols designate people, places, and dates while stylized images of plants, animals, rivers, roads, and other features indicate

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cultural center. An exhibit catalog, *El Lienzo de la Conquista Quauhquechollan—A Chronicle of Conquest*, describes both the map and the project.

Sharing the Story

Although thousands of people have viewed the exhibit and the animated feature, a Web site could potentially share the map's story with millions of people worldwide. UFM approached Luis Fernández, president of Geosistec, about making the lienzo project accessible to more people.

"Our goal was to find a way to merge modern cartographic tools with the concept of 'living geography' through which the Mesoamerican peoples communicated stories, legends, and traditions based on collective experience and which had a narrator as the key component," said Fernández.

Founded in 1994, Geosistec provides geodatabase management, thematic mapping, and geographic analysis to governments and companies in many fields. The creation of a comprehensive geographic database for Guatemala, El Salvador, and Honduras has positioned the company as a leading provider of geographic

content for automated vehicle location (AVL) applications in the Central American region.

Geosistec had created dynamic Web applications for environmental monitoring, telecommunications services, and emergency response. However, the lienzo project was the company's first experience making historic documents and maps dynamically available over the Web. Geosistec has a history of adopting cutting-edge technologies.

After following the development of Microsoft Silverlight technology, the company chose it for this project rather than Adobe's Flex, a more mature technology, believing it to have more potential for rapid evolution. Silverlight has proved to be a strong platform for providing rich functionality and good user interactivity. The responsive, intuitive, and dynamic Web map built by Geosistec uses the ArcGIS API for Microsoft Silverlight.

Although this was the first time Geosistec had used Silverlight, the team of three staff members took just two months from conception to completion—working on a part-time basis. Developing the conceptual design and innovative tools for the site took half the time spent on the project. VisualSVN (Subver-

sion for Visual Studio), a plug-in for the open source version control system Subversion, helped manage the project by sharing multiple versions of the code for easy integration and deployment of the application.

Relating this ancient pictographic map to a modern map presented certain challenges because the lienzo lacks a spatial reference and map units. In addition, its emphasis on the story line meant that a single location might appear several times if more than one significant event occurred there.

Using a timeline handles these problems and performs the function of the traditional narrator. It relates the events and images selected on the lienzo with locations and attributes on a smoothly scaling modern map.

Developing new tools for exploring the lienzo and related geographic content was among the most challenging aspects of the project. The Flip and Swipe tools promote unstructured exploration of the map's information. The Flip tool exchanges the display of the modern map with a scene-by-scene description of events on the lienzo without requiring users to open another window or leave the current one. With the Swipe tool, the user can explore the *Lienzo de Quauhquechollan* as it appears now and as it did when it was first painted nearly half a millennium ago.

Optimizing the user experience while exploring the lienzo and geographic content it depicts and incorporating information compiled by Universidad Francisco Marroquín on the places, symbols, clothing, and plants shown in the lienzo tested the team's mettle. The resultant Web application marries technology and tradition so the story the *Lienzo de Quauhquechollan* tells can be "heard" by people from around the world.

Conclusion

It is often said that maps tell as much about the mapmaker as the landscape. The *Lienzo de Quauhquechollan* project has given modern viewers, used to the conventions of western cartography, a different way of looking at geography—one that is intertwined with history. Deciphering this map has also provided new insights into the historical events surrounding the conquest of Guatemala. The Web site (lienzo.ufm.edu) created by the UFM and Geosistec is retelling the dramatic story of one of the oldest and most striking lienzos to a 21st century audience.



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Lienzo de Quauhquechollan at User Conference

Visitors to this year's ESRI International User Conference in San Diego, California, had many opportunities to learn about and meet the people who were involved in the lienzo project. For those who did not attend the User Conference, these resources are available online.

- The Web site *A Chronicle of Conquest—Quauhquechollan* at lienzo.ufm.edu/cms/en/home.
- Giancarlo Ibárgüen, president of Universidad Francisco Marroquín, gave a paper presentation. A link to his paper is in the online version of this article at www.esri.com/arcuser.
- Ana Lucía Ortiz of the Universidad Francisco Marroquín and Luis Fernández, president of Geosistec, gave a presentation on the map restoration project during the Lightning Talks session held at this year's conference. Listen to Living Geography with ArcGIS Server. *Lienzo de Quauhquechollan: a Chronicle of Conquest* at http://www.esri.com/events/uc/agenda/lightning_talk.html.



www.lienzo.ufm.edu