February 2007

Technology Left Behind -- GIS and the Library: Part 2

Cris Ferguson

Furman University, cferguson13@murraystate.edu

Follow this and additional works at: <https://docs.lib.purdue.edu/atg>

Part of the [Library and Information Science Commons](#)

Recommended Citation

Ferguson, Cris (2007) "Technology Left Behind -- GIS and the Library: Part 2," *Against the Grain*: Vol. 19: Iss. 1, Article 39.
DOI: <https://doi.org/10.7771/2380-176X.5260>

This document has been made available through Purdue e-Pubs, a service of the Purdue University Libraries. Please contact epubs@purdue.edu for additional information.

Framework developed in 2006, particularly the analysis of other standards organizations' activities to discern areas of overlap and gaps in standard development. For those areas where NISO's activities overlap with other areas of standards, we will look to partner with the standards organizations in those fields to find common solutions. Where there are gaps, the Committee will look at ways that NISO can energize activities in those areas.

Since much of the standards activity at NISO has focused on the important work of creating, organizing and curating information, the Content and Collection Management Committee will be the largest Topic Committee and will manage the largest portfolio of standards. Leading this important committee will be **Ted Koppel**, Verdi Product Manager at **Ex Libris**. The portfolio of this group will include management of standards such as: **Standard Address Number (Z39.43)**, **International Standard Serial Numbering - ISSN (Z39.9/ISO 3297)**, **The Dublin Core Metadata Element Set (Z39.85/ISO15836)**, and **Library Binding (Z39.78)**. With the maturation of electronic resource products and services, many aspects of this topic will develop as critical areas for standards work. Key points of friction such as licensing, resource management systems and preservation are areas the Committee will explore for standardization.

The Discovery to Delivery Topic Committee's focus will be on search, retrieval, and

distribution systems and the standards that underlie and improve their performance. **Mike Teets**, Vice President, Global Product Architecture at **OCLC**, has agreed to lead this committee. Among NISO's current standards that will be coordinated by this group are: **Information Retrieval: Application Service Definition & Protocol Specification (Z39.50)**, **OpenURL Framework (Z39.88)**, and the **Circulation Interchange Protocol — NCIP (Z39.83)**. Future developments involving the exchange of bibliographic information, search functionality, and semantic Web developments will make this an exciting area of growth for NISO.

Business Information is the third of the initial Topic Committees NISO is organizing. As business intelligence and data play an increasingly important role in successful operations, focusing on this area will help to improve publisher and library productivity. **Patricia Brennan**, Manager, Product Development at **Thomson Scientific**, will lead this group. Current NISO standards that will be managed by the Business Information Committee include: **Standardized Usage Statistics Harvesting Initiative — SUSHI (Z39.93)**, **Information Services and Use: Metrics & Statistics for Libraries and Information Providers — Data Dictionary (Z39.7)** and **Criteria for Price Indexes (Z39.20/ISO 9230)**. Other areas of exploration will include library performance measures, application of online usage data and organizational identifiers.

Over the past two months, NISO has been reaching out to solicit participation in these different committees and we have met with terrific response. Only a handful of people we have

approached were unwilling or unable to participate — a sign of the importance of and interest in the work we are undertaking. It is also a sign of the significant support — individual and organizational — there is in the community for our activities. The Topic Committees are still in the process of pulling together participants and seeking volunteers. People interested in participating in these groups are encouraged to contact the NISO offices.

The groups NISO are organizing will add improved knowledge and energy to the development process. Led by energetic volunteers and supported by dedicated professionals, we hope that this structure will facilitate more rapid development of standards. Also, the broader participation will help ensure the creation of standards that are highly relevant and widely adopted. Standards are meant to provide common solutions to community issues. This new structure will help bring original and timely solutions to the front of our agenda so that we can assist our community in being more productive and thereby serving our and their constituents more effectively.

It certainly is an exciting time for NISO and for the field of libraries and information exchange overall. With so much activity and need for standard-based approaches, it is not surprising the amount of energy and time people are willing to invest in NISO and the standards process. In the coming months, you will be hearing a great deal more from each of the groups outlined here. 🌱

Technology Left Behind — GIS and the Library: Part 2

Column Editor: **Cris Ferguson** (Electronic Resources/Serials Librarian, James B. Duke Library, Furman University, 3300 Poinsett Highway, Greenville, SC 29613; Phone: 864-294-2713) <cris.ferguson@furman.edu>

Column Editor's Note: This column is the second installment in a two part discussion of **Geographic Information Systems (GIS)** services. The first part of the discussion, which can be found in the December 2006-January 2007 issue of **ATG**, defined **GIS** services and discussed the ways in which libraries can provide **GIS** services to their patrons.

This second installment will highlight and summarize examples of the innovative ways that libraries are using **GIS** to enhance their own services and collections. Four specific **GIS** related projects are discussed. The first two projects, an analysis of the branches and services of **Weber County Library System** in Utah and the measurement of in-library book use at the **MacKimmie Library** at the **University of Calgary**, were both pilot projects to investigate the ways in which **GIS** can be used by libraries to examine the effectiveness of their own services. The last two projects, the **University of Arizona Library's** construction of the **Arizona Electronic Atlas**

and the **National and University Library of Slovenia's** efforts to integrate special collections with historic maps, demonstrate how **GIS** can be used to enhance access to library collections. — CF

Weber County Library System

JaNae Kinikin used **GIS** in a study of the **Weber County Library System (WCLS)**, which encompasses Weber and Davis counties in Utah, to help identify the best location for a new library branch. The study focused "on the location of current patrons of the library system, as well as analyzing areas for the construction of additional branch libraries." (Kinikin 102) Two possible branch locations were proposed, one in the northwest of the county and one in the southeast. **GIS** analysis was used to see if one of the locations would better serve library patrons than the other.

To obtain library patron data, patron addresses were extracted from the library system's database. The address data was limited

to only those patrons who had checked out at least one item from the library system during a pre-determined week. The study excluded patrons with P.O. Boxes, because they could not be mapped, and patrons who did not check out an item during the specified week.

Kinikin used **ArcView** as the **GIS** software for the project. The mapping process was completed in several layers. First, **Census Tiger File 2000 Street Network** provided the basic county layout and a street map. "A layer was then added that included the Weber County main library and its branches...After that, the addresses extracted from the patron database were matched to the street network of Weber and Davis Counties using **ArcView's** geocoding feature." (Kinikin 103) Lastly, data from the 2000 census was added, "to determine population demographics of the existing system and the prospective branch services." (Kinikin 104)

To help analyze the data, concentric circles were drawn on the map "to determine the num-

continued on page 81

ber of patrons living within a certain distance of each library.” (Kinikin 104) Locations of the two projected branches were also plotted in this manner. It was found that “18% of the library system’s patrons in this study reside within a three-mile radius of the prospective southeast branch.” (Kinikin 105) Based upon the mapping of the patron addresses relative to the prospective branch library locations, it was determined that a branch in the southeast area of the county would likely be supported. It was also found that at least one of the library branches served a large Hispanic population, indicating the possible need for increased Spanish language services at that branch.

The GIS analysis of WCLS was both built and conducted by Kinikin, Science Librarian at Stewart Library, Weber State University. In recent years, commercial GIS products have become available to perform the same kind of investigation. Library Decision, a Civic Technologies product, is one such service, helping libraries “plan and manage public services and facilities.” (<http://www.civictchnologies.com/library/index.cfm>) To see a demonstration of Library Decision visit: <http://www.librarydecision.com>.

MacKimmie Library, University of Calgary

GIS services provide libraries with new opportunities and techniques for evaluating their own collections. Jengfeng Xia conducted a “series of projects for developing GIS into a tool to manage and analyze the usage characteristics of library books.” (Xia “Using GIS to Measure In-Library Book-Use Behavior” 186) The projects investigated issues such as the correlation between bookshelf heights and the frequency of book use, the management of the physical space within a library, and helping patrons locate library items. (See the list of References at the end of this column for a list of some of Xia’s GIS related research.)

The general premise behind each of Xia’s projects is that maps can be created of a library’s collections and facilities. Various pieces of data can then be overlaid on top of the maps, and displayed visually, rather than in a table format.

For example, Xia’s article “GIS in the Management of Library Pick-up Books” outlines the process of creating “an automated tool that includes a database containing data on book use (which can be entered manually by people or scanned in by a device), an analytical mechanism to manipulate data, and an integrated interface to show the data in dynamic and visual form.” (Xia 209) Essentially, Xia describes the creation a GIS database that will map the use of pick-up books to identify the most heavily and least used areas of a collection. The project was conducted at the MacKimmie Library at the University of Calgary.

The first step in the process was to collect the call numbers of the pick-up books, prior to being reshelfed. Xia defined pick-up books as “books and periodicals ranked on bookshelves

in library collection sections and pulled out of stacks by readers.” (Xia 211) Library student assistants manually wrote down the call numbers of all of the pick-up books after regular sweeps of the library. The “individual call numbers were entered into a database with the purpose of making comparisons between shelf-ranges on each floor to look for the relative distribution patterns of library book use in the ArcView Analysis.” (Xia 211) Xia noted that this process was time intensive, and suggested one possible solution would be to use RFID tags in the books, so that the call numbers could be scanned upon pick-up, rather than noted manually.

Maps were then created of the various floors in the MacKimmie Library down to the shelf range level. For each range of shelves, the beginning and ending call number were noted. “By examining the distribution of books falling into the call-number scope of each shelf-range and plotting figures onto the floor maps, ArcView displayed various shades of colors (for book numbers) in different polygons (for shelf-ranges) showing the various densities of in-library book use in different locations.” (Xia 212)

Examination of the distribution of call numbers indicated that book use varied between floors and shelf ranges. Xia noted that “by referring to these floor maps, the librarian learns where adjustments are needed. Special attention should be paid to the shelf-ranges where books are seldom or most often pulled out, so that they can be investigated further.” (Xia 214)

Arizona Electronic Atlas, University of Arizona

The University of Arizona Library first “instituted a GIS service in 1996 as a result of participation in the Association of Research Libraries (ARL) GIS Literacy Project.” (Pfander and Carlock, under “GIS at the University of Arizona Library”) According to Pfander and Carlock, the library identified and acquired geospatial data sets and subsequently loaded both the data sets and ESRI’s ArcView software on dedicated workstations. The library also created 12 pre-designed maps in anticipation of user needs.

The University of Arizona Library’s early experiences with its GIS service indicated that most students needed assistance to make use of the service, largely due to the level of knowledge required to use the ArcView software. “To address this, the library partnered in 1998 with the School of Natural Resource’s Advanced Technology Group to create GeoFac — a user-friendly graphical interface to ArcView...GeoFac consolidates a 20-step process down to a manageable point-and-click interface requiring only three simple steps.” (Pfander and Carlock, under “GIS at the University of Arizona Library”)

User feedback persuaded the library “to extend the GeoFac concept by taking it to the Web and providing access to a wider range of Arizona-specific geospatial data.” (Pfander and Carlock, under “Atlas Planning and Partnerships”) In 2000, the library formed the Arizona Electronic Atlas Project Team, which worked in partnership with the Arizona Department of Library, Archives, and Public Records and the State Cartographer’s Office. With the assistance of an Institute of Museum and Library Services (IMLS) National Leadership Grant for Libraries, awarded in 2001, funding was obtained for hardware, software, and data conversion and programming, which were contracted out to Farragut Systems of Lafayette, Colorado.

Making the decision to include only data that were available state-wide, the project team narrowed the possible datasets down to 19 different categories of dataset, including factors such as crime trends, land ownership and boundaries, flood zones, and geology and mines. The data were divided into 4 thematic maps: Natural Resources, Business and Economics, People and Society, and People and Environment (since renamed to Environment and Population). (Pfander and Carlock, under “Data Selection”) The Arizona Electronic Atlas has been made freely available through the University of Arizona Website at <http://atlas.library.arizona.edu/index.html>. The project team has also created a Gallery of maps, offering some of the most commonly requested maps formatted for easy printing or downloading. (<http://atlas.library.arizona.edu/gallery/index.htm>)

Pfander and Carlock indicated that the Atlas has proved useful in a variety of circumstances at the University of Arizona, including basic fact-finding as well as more advanced data analysis. Advanced GIS users can download data from the site, which they can use to build their own maps. The Atlas has also established itself as a tool for promoting geographic literacy. To promote the Atlas’ use in the classroom, tutorials and learning modules were created and added to the Atlas Website. (Pfander and Carlock, under “Reference and Instructional Applications in the Library and “Atlas Application on Campus”)

National Library of Slovenia

As part of an effort to extend access to historic materials, particularly through a virtual library, the National and University Library of Slovenia (NUL), undertook “a pilot Web-based application that emphasizes the use of novel techniques, such as Geographic Information Systems (GIS), for creating user-friendly access to diverse items within the collection.” (Solar and Radovan 196) The pilot project focused on providing access to historic maps and other special collections in the Map and Pictorial Collection of the NUL, by integrating text, images, maps, and sound recordings in a single electronic, GIS-based interface. (Solar and Radovan 197)

continued on page 82

Technology Left Behind from page 81

According to **Solar** and **Radovan**, the project was broken down into three phases:

- 1) the geo-rectification and overlaying of historical maps of Slovenia and Ljubljana with contemporary maps;
- 2) the creation of a place-name point layer for historical and contemporary place names; and
- 3) the insertion of pictorial items (portrait images and views) at appropriate locations.” (197)

The geo-rectification process entailed aligning historical maps with contemporary, **GIS** readable maps. Beginning with “*Special—Karte des Herzogthums Krain*,” a Slovenian map of historical significance, **NUL** began the process of geo-rectification first by converting the historical map to current longitude and latitude. Then, ten ground control points were defined on “*Special—Karte des Herzogthums Krain*” and, using **ArcMap**, they were matched to the same ten ground control points on a contemporary military map. (**Solar** and **Radovan** 197) This same process was followed to geo-rectify several other historic maps.

A gazetteer that was originally published in 1846 as a supplement to “*Special—Karte des Herzogthums Krain*” provided the basis of the place-name point layer. “It enabled users to query current and historic Slovenian and German names from the ‘*Special—Karte des Herzogthums Krain*’ referencing the same geographic location, linking the name of the place to the map image.” (**Solar** and **Radovan** 197-8)

For the last component of its service, the **NUL** inserted hyperlinks on the maps connecting to other digitized content of historic value, including views of the city of Ljubljana from the same time period as the maps; portrait images of the Slovenian poet, **France Prešeren**; and the national anthem, which was written by **Prešeren**. (**Solar** and **Radovan** 198)

The resulting map is zoomable and matched with contemporary coordinates. The spatial data on the map “are the basis for the digital archive in which other pictorial material is connected by hyperlinks.” (**Solar** and **Radovan** 199) The case study at **NUL** was selective, and there is potential to extend the project to other collections. **Solar** and **Radovan** note that future development of the project will be dependent upon several factors such as the loading time required to view the map images, the creation of bibliographic data to accompany the maps and hyperlinked materials, and the training required for the staff working on the project. (**Solar** and **Radovan** 199)

Conclusion

The four projects highlighted here show only a few of the ways that **GIS** services can be used by libraries. While only pilot projects, the preliminary research of both **Kinikin** and **Xia** demonstrate that **GIS** could prove a valuable tool to libraries in the evaluation of their collections and services. The **Arizona**

Electronic Atlas and the digitization project at the **National and University Library of Slovenia** both use **GIS** to provide access to collections and materials that might normally be inaccessible to the average user. For further information on any of the projects described above, please see the list of references below.

References

Kinikin, JaNae. 2004. Applying Geographic Information Systems to the Weber County Library System. *Information Technology and Libraries* 23, no. 3 (September): 102-107. <http://www.ala.org/ala/lita/litapublications/ital/volume23a/number3a/kinikin.pdf>.

Pfander, Jeanne, and Danielle Carlock. 2004. The Arizona Electronic Atlas: a New Reference and Instructional Tool. *Issues in Science and Technology Librarianship* 46 (Fall) <http://www.isrl.org/04-fall/article.html>.

Solar, Renata, and Dalibor Radovan. 2005. Use of **GIS** for Presentation of the Map and Pictorial Collection of the National and

University Library of Slovenia. *Information Technology and Libraries* 24, no. 4 (December): 196-200. <http://www.ala.org/ala/lita/litapublications/ital/volume242005/number-4december/contentv424/solar.htm>.

Xia, Jingfeng. 2005. Visualizing occupancy of library study space with **GIS** maps. *New Library World* 106, no. 5/6 (May): 219-233.

_____. 2005. Locating Library Items by **GIS** Technology. *Collection Management* 30, no. 1: 63-72.

_____. 2004. **GIS** in the Management of Library Pick-up Books. *Library Hi Tech* 22, no. 2: 209-216.

_____. 2004. Library Space Management: A **GIS** Proposal. *Library Hi Tech* 22, no. 4: 375-382.

_____. 2004. Using **GIS** to Measure In-Library Book-Use Behavior. *Information Technology and Libraries* 23, no. 4 (December): 184-191. 🐼

I Hear the Train A Comin' — ALCTS: Part 1

Column Editor: **Greg Tananbaum** <gtananbaum@gmail.com>

Of all the feedback I have received regarding this column, two things seem to garner the most attention. The first is **Web 2.0**. I wrote an essay about this several issues back, and I was pleased to engage in a dialog with a number of readers about the finer points of this wave and its implications for the scholarly communication space. What is **Web 2.0**? What is not **Web 2.0**? What are some examples? How do repositories and open access fit in? And where are we going here? The second item about which I have frequently been asked is my somewhat colorful experience as an author. You'll recall from references in past columns that I am the author of the humor book *Atomic Wedgies, Wet Willies, and Other Acts of Roguery*. In this and next issue's essays I am revisiting both **Web 2.0** and *Atomic Wedgies*, with the ambitious intent of analyzing the former through the lens of the latter.

Recently, I had the wonderful opportunity to speak in front of the **Association for Library Collections & Technical Services** in commemoration of their 50th anniversary. In doing so, I was asked to discuss the changing nature of scholarly communication and the role libraries play and will play as new publication models are unveiled. As a narrative conceit, I decided to periodically compare the challenges and opportunities we face as information providers with some of the most annoying and

embarrassing pranks ever practiced at summer camp and on the playground. This column is adapted from that session.

I am sure you are all familiar with the Kick Me Sign, the art of taping a provocative message to a person's back, typically a missive urging the general public to, in fact, kick the unwitting sign wearer. I would argue that we are in the Kick Me Sign era of scholarly communication. As with the Kick Me Sign, there is an expert conveying information, knowledge, instruction, and so forth. The connection is a one-to-many connection. It is definitive, authoritative, and often authoritarian. Likewise, today's scholarly journal, textbook, or monograph circulates one person's work into the hands of many people. The one communicates with the many in unidirectional fashion. The marked socialization and collaboration that defines **Web 2.0**, along with its emphasis on the egalitarian sharing of information, data, content, expertise, and opinions, are far removed from the top-down nature of traditional scholarly communication.

So if the current state of scholarly communication is the Kick Me Sign era, what is the **Web 2.0** phase we seem to be entering?

continued on page 83