



Mobile Information Technology

Supporting the Preservationist and Reaching the
Public

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THESIS

The professional historic preservation community has been slow to recognize and embrace computer and information systems technologies and are in danger of missing opportunities to leverage new and rapidly evolving mobile information systems technology to significantly advance new tools for the professional preservationist, to reach and engage a broader public audience, and ultimately to preserve and protect built historic resources.

ABSTRACT

Historic preservationists must close the technology gap and take the lead in developing mobile information systems tools that address and further two fundamental areas of historic built environment preservation: 1) the professional preservation activities of identifying, evaluating, analyzing, and preserving historic resources; and 2) engaging and educating the public to raise awareness and appreciation of historic places. The related fields of architecture, planning, and heritage tourism are creating innovative tools to serve their needs; historic preservation must do the same.

In the past, the historic preservation community “thought leaders” have fallen short in promoting, adopting, and molding new information systems technology to serve historic preservation professionals. While recent technology efforts in the areas of data management, documentation, website, and social media are encouraging, there are still gaps. And the larger concern remains: that historic preservation will lose the opportunity to lead in new technology areas that could be hugely beneficial to advancing the goals of protecting historic sites.

This paper will examine the potential uses for new mobile information technology in two areas: 1) professional historic preservation information gathering, documentation, analysis and 2) public engagement, outreach and education. In order to understand the challenges that might be faced in driving the adoption of these new technologies, the paper provides an overview of how the key national historic preservation organizations have regarded and adopted computer and information system technologies in these areas, and identifies existing critical gaps. The research focused on articles and information published by the national organizations that are the recognized national historic preservation “thought leaders” for best practices and technology information. The resources reviewed included articles and information published from the 1980s to the present by the National Trust for

Historic Preservation, the National Park Service, the Association for Preservation Technology, and the National Center for Preservation Technology & Training. Also included are examples of how national organizations and organizations in New England are currently using computer, information system, and internet technology. To envision the possibilities offered by mobile information technology, diverse technology information sources such as *Wired* magazine, virtual reality websites, and various technology news outlets were reviewed.

The review identified some critical gaps in current historic preservation professional tools and processes for gathering and recording data and information – they are time-consuming and inefficient, and the information is not readily accessible or usable. In a time of ever-decreasing funding, historic preservation cannot afford to continue the inefficiencies of duplicative and potentially inaccurate efforts to validate and record information, and synergy lost because the preservation community cannot easily access and use the collected data. Tools to streamline the identification, evaluation, documentation, and analysis of historic resources could allow amateurs and less-seasoned professional to take on more survey and inventory work, thereby freeing up limited resources to focus on interpretation, strategies, and actions to recognize and protect historic resources.

Information on the internet and social media reaches a primarily self-selecting audience – people who already have an interest in history, historic preservation, or heritage tourism. In order to reach a relatively disinterested public, historic preservation must turn to the mobile technology that more and more people, especially the younger generation, are integrating in their everyday search for information.

Looking forward, we challenge historic preservationists to embrace and drive technology to advance professional tools that will nurture understanding of historic resources and collaborative relationships; and to engage a larger and younger audience to learn about, experience, value, and to ultimately support preservation of the historic built environment.

INTRODUCTION

Information technology has come a long way since the early 1980s and 1990s. In the past thirty years the development of software programs to store and manage data, the creation of the internet, and an overall change in how people perform daily activities. Morning newspapers are no longer sought; laptops and smart phones deliver the most up-to-date information via a newsfeed from multiple news service providers.¹ Bills are paid without ever picking up a pen, recipes are found without a cookbook, and groceries can be ordered and delivered directly to people's homes all from a smart phone. Technology has not only affected how people manage their daily lives but has changed how the world does business. The days of business letters on watermarked heavy stock paper have now become obsolete as much business is handled via email. The field of architecture has benefitted from technological advancements. No longer do architects take out their protractors and straight edges to design a building and calculate dimensions; they most likely log into an AutoDesk product and design a building along with mechanical systems and then generate a 3D model.

Technology has also influenced the Preservation field, although not as much as the sister fields of architecture, planning and construction who have adopted technology in the way they do business. The development of software programs to track and manage data and the move to the web were important steps for many preservation organizations. Recently preservation has moved towards adopting popular social media technologies but has been slower to embrace cutting edge mobile technology.

THE PAST: Technology and Preservation

The Association for Preservation Technology (APT) was one of the first preservation organizations to start the discussion surrounding computer technology in the Historic Preservation community. In 1984, the *Bulletin of the Association for Preservation Technology* dedicated four articles to computers and what the technology meant for preservation.² The articles discussed how 'microcomputers' worked,

¹ Aaron Smith, 35% of American adults own a smartphone. Pew Internet & American Life Project, July 11, 2011, <http://pewinternet.org/Reports/2011/Smartphones.aspx>, accessed on August 1, 2011. This article also goes on to state that one quarter of smartphone owners use their phone for most of their online browsing.

² *Bulletin of the Association for Preservation Technology* 16, no.2 (1984). The four articles were: Nancy Benziger Brown, "Microcomputers: What, Why and How," *Bulletin of the Association for Preservation Technology* 16, no.2 (1984); Barbara Wyatt, "The Computerization of Historic Preservation," *Bulletin of the Association for Preservation*

how databases could be set up, and started to identify issues with how preservation was using technology. In "The Computerization of Historical Preservation," Barbara Wyatt stated that challenges had already started to appear for the preservation community that was using technology: "State and municipal preservation offices have plunged into automation with little or no contact with other offices... Not only has the cumulative cost to historic preservation been high, but the redundancy of effort has led to a general lack of coordination in computerization of what could be considered one large data base, the national site inventory."³ The redundancy and lack of coordination that Wyatt speaks of can be seen today. Many states have developed their own software programs and databases with varied levels of functionality and sophistication. To illustrate this point, consider Massachusetts, California, and Washington. In the early 1980s, the Massachusetts Historical Commission (MHC) invested in the creation of MACRIS (Massachusetts Cultural Resource Information System), a computerized database that catalogues all of the historical resources that have been inventoried in the state. Twenty plus years later, MACRIS is still the tool that is used to manage the state's inventory. It is limited in that it is built on a customized platform that can only be modified by a very limited number of programmers. Currently the state has focused efforts to scan all inventory forms and make them available to the public online. In California, the California Historical Resources Information System (CHRIS) does not allow access without a formal access agreement and charges for online research. The Washington Information System for Architectural and Archaeological Records Data (WISAARD) database is more sophisticated in that it interfaces maps with electronic forms and various searchable fields.

Wyatt also had the foresight to identify the three major problems with the preservation community's relationship with computer technology as lack of: computer literacy, funding, and standardization.⁴ The following year, 1985, Harold Kalman wrote to the *APT Bulletin* about their previous year's computer-focused issue. He claimed that preservationists were already behind the times, that the information was not groundbreaking, and that some advice given was already outdated. In his article he states: "The four articles are...very conservative. None approaches the state-of-the-art reporting which

Technology 16, no.2 (1984); Herbert Gottfried, "A Computer Program for Recording Historic Buildings Using the SPSS (Statistical Package for the Social Sciences) Program," *Bulletin of the Association for Preservation Technology* 16, no.2 (1984); Bruce MacDougal, "National Register Computerization," *Bulletin of the Association for Preservation Technology* 16, no.2 (1984).

³ Barbara Wyatt, "The Computerization of Historic Preservation," *Bulletin of the Association for Preservation Technology* 16, no.2 (1984): 11.

⁴ Barbara Wyatt, "The Computerization of Historic Preservation," *Bulletin of the Association for Preservation Technology* 16, no.2 (1984): 11.

the APT Bulletin has long striven to achieve. The introduction to the microcomputers by Nancy Benzinger Brown rehashes the kind of information that microcomputer magazines have been offering neophytes for years. The material in Barbara Wyatt's "The Computerization of Historic Preservation" breaks no new ground...Herbert Gottfried promotes the use of SPSS as a database and analytical tool, but his version of SPSS is an archaic mainframe system unavailable – or indeed undesirable...And Bruce MacDougal's report on the first tentative arrival of the computer age at the National Register only emphasizes how out of touch with the times that organization can be."⁵

While the *APT Bulletin* tried to introduce the preservation field to some computer technology options, the publication fell silent from 1985 until 1994⁶ when it introduced a new column, "Computer Forum."⁷ The column at best covered very basic internet information and did not expand to consider a more sophisticated presentation of the technological possibilities.⁸ Again, APT tried to bring technology to preservationists, but failed with its rudimentary information.

Small strides were being made amongst preservationists in the area of technology in the 1990s and early 2000s in comparison to the architecture field. A glance at *Forum Journal* and *Forum News* from 1987 to 2005 illustrates this point. Much of the work being done to engage with technology at that time was GIS based. A handful of articles appear in these publications between these years that focus on the use of technology in preservation.⁹ In comparison, the architecture field was already mobilized and driving technology for new tools. One of these tools, AutoCAD, a computerized drafting tool for architects and engineers, was first released in 1982 and to this day continues to be the industry standard with frequent releases integrating the newest developments.¹⁰

⁵ Harold Kalman, "Computers and Preservation," *Bulletin of the Association for Preservation Technology* 17, no. 2 (1985): 68.

⁶ No articles were published in the *APT Bulletin* between Kalman's letter to the editor in 1985 and the introduction of the Computer Forum in Volume 26, No. 1, 1994.

⁷ Barrett Kennedy, Dick Ryan and Tanya Wattenberg, "Computer Forum," *APT Bulletin* 26, no. 1 (1994): 3-5.

⁸ Kalman lists a couple of examples of where Preservationist should be looking for ideas. He references The Canadian Inventory of Historic Buildings that has used a computer database since 1970. Realizing that many would not be able to afford an intricate system like the Canadian's database, he mentions the use of cost effective off-the-shelf database software.

⁹ The four articles referenced are: John F.W. Rogers, "The New Decade: Preservation Changed by Technology," *Forum Journal* (Winter 1990); H.Grant Dehart, "The Future of the Preservation Movement," *Forum Journal* (September/October 1991); Deidre McCarthy, "Applying GIS Technology to Preservation Planning," *Forum Journal* (Summer 2001); Stewart Brand, "A Place of Preservation in a World of Change," *Forum Journal* (Winter 2001).

¹⁰ Shaan Hurley, "AutoCAD Release History," *Between the Lines: All things Autodesk & Technology*, entry posted unknown, http://autodesk.blogs.com/between_the_lines/autocad-release-history.html (accessed August 5, 2011).

In 2007, the Wyoming State Historic Preservation Office organized a survey to gauge how other states were handling data management. The findings of this survey were presented to “promote discussion” at the 2007 annual National Conference of State Historic Preservation Officers meeting. The statistics, although informal, were and still are quite concerning. In 2007, the average percentage of inventory in an electronic data system was 69.8 percent. The average percentage of inventory in a geographic information system was 46.4 percent.¹¹ Some may argue that this shortfall is due to lack of funding. Historically the Historic Preservation Fund has never been fully funded by Congress. While this may be true, this illustrates that states are not willing to spend money outside of their basic statutory responsibilities.

One of the questions posed to the SHPOs was “Would you be interested in participating in the development of a core business/data model that captures common data for SHPO’s?” Only 59.6 percent said yes to this question.¹² Other questions tried to determine if the states had cost estimates for bringing data up-to-date and an estimate for technical costs. Over one quarter of the states did not have an estimate of how much money was needed.¹³ The results of this survey prove Barbara Wyatt’s earlier observations that the preservation community has problems with the lack of standardization and too little commitment to funding computerization.

From looking at our past, we can conclude that preservationists have been lagging in technology since the 1980s. And despite the widespread adoption of computer technology by the public and across most disciplines,¹⁴ Barbara Wyatt’s observations in the 1980s still ring true today - the preservation

¹¹ Some states had very high percentages of inventory in an electronic data system and GIS while others had zero or a very low amount. It is important to note that the numbers listed above are averages.

¹² Forty-seven states and Puerto Rico responded to the survey. This percentage is taken from the pie chart associated with Question #7 of the survey.

¹³ Mary Hopkins, “Square Table Discussion: Data Management in SHPO’s,” (survey findings presented at the 2007 National Conference of State Historic Preservation Officers, Washington, D.C., February 26 – March 1, 2007). Survey findings can be found at <http://www.ncshpo.org/current/pdfinitiatives/datamanagementsurvey.pdf>.

¹⁴ The number of household with computers increased from 8.2% in 1984 to 61.8% in 2003. The number of households with internet use at home increased from 18% in 1997 to 68.7% in 2009. Numbers reported by U.S. Census Bureau, Current Population Survey, October 1984, 1989, 1993, 1997, 2000, 2001, 2003, 2007, 2009. Also according to the U.S. Census Bureau, “In 2009, U.S. nonfarm businesses with employees spent a total of \$253.8 billion on noncapitalized and capitalized technology (ICT) equipment, including computer software.” U.S. Census Bureau, “Information & Communication Technology Survey Summary of Findings 2009,” under “Business and Industry,” http://www.census.gov/econ/ict/xls/2009/summary_of_findings.html (accessed August 7, 2011).

community still lacks computer literacy and guidance from within the field, there is too little commitment to funding computerization, and there is a lack of standardized data.

THE PRESENT

Information Systems Technology in Historic Preservation Practice

Today technological efforts in preservation practice are often focused on GIS. Currently the National Park Service (NPS) has taken a leadership role funding development of these systems and best practices. The NPS Cultural Resources Geographic Information Systems (CRGIS) facility is driving the current efforts to organize and manage the NPS historic preservation data by linking it to common spatial and geographic data that can then be used by Global Positioning Systems (GPS) and Geographic Information Systems (GIS). In 2003, the NPS made the case for the importance of GIS efforts after identifying that 80-90% of NPS data was geospatial. The 2006 NPS Management Policies reiterated the importance of information management and committed to enhancing GPS and GIS while also making the data available online to the widest possible audience.¹⁵ In recent years, the National Park Service's stated goal for using GIS data has been to better manage park resources by using integrated geographic and tabular data from a variety of sources to document natural and cultural resources¹⁶, to perform analysis, and to model real and theoretical situations and scenarios.¹⁷ GIS is also used to enhance mapping and monitoring efforts, and condition assessments; and is especially effective when applied to larger cultural resources and landscapes such as groups of buildings and battlefields. GPS and GIS can also assist disaster response efforts;¹⁸ at the request of the Federal Emergency Management Agency(FEMA), the NPS used these systems to survey and document the impact of Hurricane Katrina on New Orleans

¹⁵ National Park Service, "Regulations, Directives, Policies and Guidelines and their Relation to NPS Geographic Information Systems," National Park Service, http://www.nps.gov/gis/data_standards/ (accessed May 21, 2011).

¹⁶ Cultural resources include but are not limited to: individual buildings and structures, battlefields, monuments, archaeological sites, engineered landscapes, historic cemeteries, historic parkways, forts, CCC roadways, Hawaiian heiaus and agrarian landscapes.

¹⁷ The National Park Service has recognized the benefits of GIS technology since the 1990s; however, it is only recently that NPS's stated GIS use has evolved from a documentation and interpretive tool to a much broader resource management tool. NPS also participated in broader international efforts to identify and bridge the gaps between information users and providers, and define best practices - between 2002 and 2007, the NPS followed the RecorDIM (Heritage Recording, Documentation, and Information Management) Initiative partnership created by the International Council on Monuments and Sites (ICOMOS), the Getty Conservation Institute (GCI), and the International Committee for Documentation of Cultural Heritage (CIPA).

¹⁸ Deidre McCarthy, "Creating Cultural Resource Spatial Data Standards," *CRM: The Journal of Cultural Heritage Stewardship*, 6 no. 2 (Summer 2009): 2-3.

neighborhoods which then allowed agencies to more quickly and efficiently complete and document Section 106 work and mitigation efforts.¹⁹

CRGIS is working to link approximately fourteen different NPS databases that describe and track cultural resources, landscapes, and museum objects; to provide better information that will also be available to the broader historic preservation community. The GPS and GIS standards that CRGIS is developing²⁰ will be disseminated to preservation organizations - CRGIS's mission is "to institutionalize the use of GIS, Global Positioning Systems (GPS), and Remote Sensing technologies in historic preservation with the National Park System as well as with the State Historic Preservation Offices (SHPOs) and Tribal Historic Preservation Offices (THPOs)."²¹

CRGIS initiatives which seek to manage data about historic cultural resources and to improve access to this important information include: digitizing HABS, HAER, and HALS project documentation; the massive undertaking of digitizing state historic surveys and automating SHPO inventories;²² exploring the use of GPS for architectural survey and documentation work and specifically for geo-referencing site plans and drawings;²³ and developing a strategy for the use of GPS and GIS to survey and evaluate cultural resources affected by natural disaster, and as a mitigation tool.²⁴ CRGIS has also experimented with creating 3-D historic building models of the North Family Shaker Village in Lebanon, New York for the Google 3-D Warehouse.

The current NPS initiatives are critical to documenting and protecting valuable cultural resources that fall within the NPS's authority; however, as these efforts fall within the broader scope of managing the National Parks, historic buildings are not necessarily the priority. And while the broader historic preservation community can access NPS information, they cannot leverage NPS tools and systems for

¹⁹ National Park Service, "Using GIS to Document Cultural Resources after a Natural Disaster," National Park Service, <http://www.cr.nps.gov/hdp/standards/CRGIS/katrina.htm> (accessed June 11, 2011).

²⁰ CRGIS's approach is outlined on the National Park Service's website. National Park Service, "Critical Nature of Spatial Data in Cultural Resource Management," National Park Service, <http://www.nps.gov/history/hdp/standards/CRGIS/spatial.htm> (accessed June 11, 2011).

²¹ National Park Service, "Cultural Resources Geographical Information System Facility (CRGIS)," National Park Service, <http://www.nps.gov/history/hdp/crgis/index.htm> (accessed May 21, 2011).

²² In a funding proposal that appears to date from 1998, it was estimated that SHPO statewide inventories included five million historic properties and half a million surveys; the number of historic properties was projected to grow by approximately 100,000 per year. National Park Service, "From Paper File to Digital Database," National Park Service, <http://www.nps.gov/history/hdp/standards/CRGIS/paper.htm> (accessed June 11, 2011).

²³ National Park Service, "Applying GPS to Historic Preservation and Architectural Surveys," National Park Service, http://www.nps.gov/history/hdp/standards/CRGIS/hist_pres_gps.htm (accessed June 11, 2011).

²⁴ National Park Service, "Using GIS to Document Cultural Resources after a Natural Disaster," National Park Service, <http://www.cr.nps.gov/hdp/standards/CRGIS/katrina.htm> (accessed June 11, 2011).

resources outside the NPS domain. Today, the NPS guides historic preservation adoption and standardization of technology as NPS provides major funding and thought leadership. However, NPS does not appear to be driving development of innovative new tools to help the professional preservationist in the field.

Information Systems Technology in Outreach and Advocacy

The strong World Wide Web (the Web) presence established by the key national historic preservation organizations is helping to get the word out to a broader audience, and setting the example for other preservation groups.²⁵ Content-rich travel information – histories, attractions, tour itineraries, maps, activities, and events – is prominently featured on the NPS and National Trust for Historic Preservation (NTHP) websites and appears to target the growing cultural heritage tourism segment as a primary vehicle for engaging and educating the public about historic resources. Visitors to the NPS website can search by state, by topic, or by site to get information and to create travel itineraries for visits to National Parks and National Register sites.²⁶ The information includes photo galleries, multi-media presentations such as podcasts and videos, interactive maps, virtual tours, GPS tours, and the occasional link to external websites and blogs to connect visitors with local and community historic and preservation groups.²⁷ The NTHP “Travel & Historic Sites” Webpage, coupled with NTHP’s Gozaic online community features, offers more extensive and collaborative heritage travel resources, including event

²⁵ The purpose of this paper is not to provide a deeper understanding of Web technology or to provide detailed research on Web technology adoption in the field of historic preservation. However, a brief overview of Web technology – specifically Web 1.0 and Web 2.0 - is in order. Web 1.0, a static display of web content with very limited user interaction, was introduced in the early 1990s and was the primary web technology between 1991 and 2003. Web 2.0 is dynamic and allows user contribution and interaction among users. The talk now is of the evolving Web 3.0 which will most likely facilitate applications that can speak directly to each other and have semantic capabilities that better understand individual user activity and its context to personalize and facilitate the user Web experience. This does not mean that Web 1.0 is obsolete; however, Web 2.0 (and eventually Web 3.0) will offer greater possibilities for engaging users. Further research could identify where historic preservation organizations are on the technology curve – have they adopted the newer Web 2.0 technology, and what discussion is there around Web 3.0? Brian Getting, “Basic Definitions: Web 1.0, Web 2.0, Web 3.0,” *Practical eCommerce* (April 18, 2007), <http://www.practicalecommerce.com/articles/464-Basic-Definitions-Web-1-0-Web-2-0-Web-3-0> (accessed August 4, 2011). Amitk, “Web 3.0 – A Semantic Web Experience,” SEOSMO.net, entry posted January 27, 2010, <http://www.seo-smo.net/2010/01/27/web-3-semantic-web-experience/> (accessed August 4, 2011).

²⁶ National Park Service, “List of Itineraries,” National Park Service, <http://www.cr.nps.gov/nr/travel/onlineitin-trav.htm> (accessed May 21, 2011).

²⁷ For example, the Salem Maritime National Historic Site website’s section on Salem’s Polish Community has a link to Polish Salem Blog, <http://www.polish-salem.blogspot.com/> (accessed August 1, 2011).

calendars, lists of guided tours and cruises, and opportunities to share information and photographs, and connect and interact with others who are interested in cultural heritage and history.²⁸

Both the NPS and NTHP are establishing a social media presence – on Facebook, Twitter, and YouTube – to reach out to a broader audience and build an online community. The NTHP is also promoting social media to “cover the basics of community building online and bringing offline campaigns online;”²⁹ NTHP’s “This Place Matters” campaign “has already galvanized thousands of individuals and organizations across the country to start conversations about preserving those places, and the stories they tell, for future generations.”³⁰

Despite the NPS’s strong web presence, the NTHP appears to be taking the lead in providing guidelines to successful adoption of information systems and social media technology by the historic preservation community.³¹ Among the recent NTHP articles providing guidelines and best practices are “2011 Museums and Mobile Survey” and “Social Media Challenges for Preservation Organizations”. NTHP and the University of Massachusetts Amherst recently offered a class “Digital Heritage as a Tool of Public Engagement with the Past” which focused on establishing a new media strategy and an online presence. The course focused on ‘quick, cost-effective and systematic methods for employing social media to communicate with the public’ about the significance and value of cultural heritage.³²

Organizations representing a broad spectrum of cultural and historic resources have also turned to the Web to raise awareness, and provide information and innovative online resources. Museums create online collections that allow the public to view artwork without leaving the house. House museums provide online tours. And communities share their histories. Online visual resources include Google

²⁸National Trust for Historic Preservation, “Travel & Historic Sites,” National Trust for Historic Preservation, <http://www.preservationnation.org/travel-and-sites/> (accessed August 1, 2011).

²⁹National Trust for Historic Preservation, *2010 National Preservation Conference: Final Program*, (Austin, TX: National Trust for Historic Preservation, 2010, 36. An electronic version can be found at: http://www.preservationnation.org/resources/training/npc/2010-austin/AUS_2010_FinalProgram_FINAL.pdf

³⁰ National Trust for Historic Preservation, “This Place Matters,” National Trust for Historic Preservation, <http://www.preservationnation.org/take-action/this-place-matters/> (accessed May 21, 2011).

³¹The NPS’s information systems and mobile technology strategy appears to have been folded into the broader area of site interpretation. Online searches of the NPS website (www.nps.gov) and the NPS Harpers Ferry Center website (<http://www.nps.gov/hfc/index.htm>) for guidelines and policies relating to Web-based media, social media, and mobile applications, turned up basic website guidelines and detailed on-site interpretation policies. NCPTT has recently published several online guides for using social media.

³² Jeffrey Guin, “LLPER42: Digital Heritage as a Tool of Public Engagement with the Past: Social Media Planning, Production and Engagement for Heritage Professionals” (syllabus, University of Massachusetts-Amherst, 2011).

Earth's historical aerial photos and Historic Map Works "Historic Earth."³³ And some groups are using the internet to promote history education programs that will teach children about significant national historical sites, and encourage them to explore, understand, and appreciate historical resources in their communities; a good example is the NPS online series of Heritage Education and Service Learning programs.

Although these websites offer a wealth of well-presented and useful information, many do not have a mobile device format. This forces travelers to do their research at home and print out the information needed for a visit. If there is a change of itinerary en route, they have to go through the process of accessing the internet and once again searching for the desired information.

NTHP has begun exploring innovative and cutting edge mobile technologies that could reach a broader audience. NTHP is partnering with Tagwhat, a new mobile location-based service, to tell stories that "describe and enhance the places around the user...changing based on where the user is and where they are looking."³⁴

Local organizations are moving ahead on the mobile technology curve and are taking the initiative to create smart phone guided tours. The Provincetown Historical Commission in Massachusetts teamed up with the Provincetown Visitor Services Board (VSB) to create a smart phone application that takes visitors on a tour of fifty historically significant buildings and sites. The Historic Provincetown Walking Tour application is GPS-based and created on an open platform, allowing it to be downloaded onto any smart phone from anyplace in the world. It includes a full-color map with all the historic resources marked with a detailed description of each property. Visitors can use their smart phones to either read about the sites or listen to the audio which features local residents describing each of the buildings. According to VSB chair, Rob Tosner, "It's a really neat way for people to look at these properties in a more high-tech fashion. The younger demographic communicates that way."³⁵ Provincetown Historical

³³ "Historic Earth" overlays historic maps and atlases onto a current Google map. Historic Map Works, "Historic Map Works," Historic Map Works, <http://www.historicmapworks.com> (accessed August 1, 2011).

³⁴ PR Web, "Tagwhat, the Mobile App that Tells 'Great Stories at Places,' Makes its Indianapolis Debut at the Brickyard 400," Yahoo News, <http://news.yahoo.com/tagwhat-mobile-app-tells-great-stories-places-makes-090022147.html> (accessed August 1, 2011).

³⁵ Pru Sowers, "There's an app for that: Provincetown historic house tour to go 'high tech'," *Provincetown Banner*, December 6, 2010.

Commission Chair, Eric Dray, sees the application as an opportunity to “create amazing pieces of interpretation and prove independently that historic preservation can add value.”³⁶

Raising money for historic preservation projects is always a challenge, and “crowd funding” Web sites such as Kickstarter, IndieGoGo, and RocketHub could be leveraged by the historic preservation community to solicit broader public support for projects. Individuals or groups can post their fundraising campaign and target. Donors are charged only if the campaign reaches 100 percent of its target. The website tracks the amount reached, number of donors, and days remaining. Currently there is only one historic preservation effort – a photography project in Boston, “Impermanence: Photographs of Endangered Historic Places.”³⁷

There are a wealth of historic preservation online information and resources. However, because people have to actively seek out this information, the audience is largely self-selecting. The challenge for the historic preservation community is to make the history and heritage of cultural resources come alive for the broader public.

THE FUTURE OF PRESERVATION AND TECHNOLOGY

Tools for the Professional

States have their own way of documenting historical resources and managing the collected data. As we saw from the 2007 Data Management in SHPO’s survey, there is a wide variety of systems utilized to collect and analyze data. As preservationists look ahead, they need to be building coalitions with other states and utilizing technology to help achieve productive partnerships.

Currently, many businesses and entities are discontinuing use of servers that are housed on-site and are looking to remote servers hosted off-site as an IT solution. The benefit of having a remote server is the accessibility that can be offered to a variety of users, in turn making data population and sharing less complicated. A large remote database, accessible to preservation professionals nationwide could revolutionize preservation. While survey would be important to the population of this database, the

³⁶ Eric Dray, interviewed by Barbara Kurze, June 1, 2011.

³⁷ Shelley Zatsky, “Impermanence: Photographs of Endangered Historic Places,” Kickstarter, <http://www.kickstarter.com/projects/908151951/impermanence-photographs-of-endangered-historic-pl?ref=live> (accessed June 1, 2011).

real benefit would be in the data analysis that has been lacking in years past. This large amount of information could give better statistics on our historic building stock and potentially provide preservationists with the information they need to advocate for the preservation of historic buildings.

Preservation professionals could begin to populate this standardized open platform remote server application by utilizing a mobile tablet device, such as an iPad, that allows them to complete building inventories on-site. Mobile tablet devices typically have a built in navigational system with GPS allowing all information to be GPS linked instantly. The survey application would prompt the profession through a battery of standard questions about building materials and practices while the user could instantly attach photographs of the materials, building techniques, and architectural details. This information along with the digital photos is immediately part of the remote server database. Using technology similar to facial recognition software, an algorithm would start to match the building materials/techniques/details being inventoried with those in the larger database.³⁸ The database also takes into consideration the location of the structure to determine regionality of materials and techniques.

The database not only is the depository for all facets of the historic building but becomes the ultimate field guide that houses descriptions, photos, and other users' photos and information. Think James Garvin's *A Building History of Northern New England*, Gabrielle Lanier and Bernard Herman's *Everyday Architecture of the Mid-Atlantic*, Thomas Durant Visser's *Field Guide to New England Barns and Farm Buildings*, and Cyril M. Harris' *Illustrated Dictionary of Historical Architecture* all rolled into one interactive guide.³⁹ Not only does the remote database house information from published sources, but also contains pictures and descriptions from other users. In some cases, the user is prompted to make a decision on whether a material or technique found is closer to one photo and description than another to make a final determination.

³⁸ Advances are being made every day on how mobile devices are being used as field guides, take for example Leafsnap. Leafsnap is an application for mobile devices that allows the user to take a picture of a leaf and the application will identify the tree based on its outline. Leafsnap utilizes visual recognition software similar to facial recognition software to determine the species of leaf. This technology could potentially be developed for identification of pieces of historic buildings. Possibly something as small yet distinct as a nail that has been in a variety of shapes through America's building history. Leafsnap, "Leafsnap: An Electronic Field Guide," Leafsnap, <http://leafsnap.com/about/> (accessed August 1, 2011).

³⁹ Currently, no large photo rich depository of published information exists. Sites such as Preservapedia could potentially house this information, but is restrictive in its Wikipedia format.

Pictures, material descriptions, and building techniques then are brought together to create a 3D model of the building. Using this 3D model, the professional can take pictures of architectural details and tap and drag them into their 3D model. In the end, a fully documented house is viewed as a 3D model with images of the real details and finishes including wallpaper, woodwork and mechanical systems. All of this information gives additional clues on how the building was designed, for whom it was designed and gives us a glimpse into a different time.

This practical application could also be utilized in times of disaster to help emergency management agencies determine if the structures they are surveying have been inventoried. It will give estimators in these scenarios the information to determine real monetary losses and aid when inventoried structures no longer exist. And in the event that a building or a structure cannot be saved or has been completely decimated by a disaster this tool will allow us to record what had been there.

The potential for this larger database hosted on a remote server is great due to the data it could compile on a regional, national, and continental level. It could provide better data on how our historic buildings and structures survive and where they survive. By pulling information together on a larger scale, preservation professionals start to engage with other regions and begin to see the larger picture of how materials and techniques developed and spread. This analysis would not only be valuable to the preservation community but to other professionals in planning, state and federal agencies encouraging additional partnerships and working relationships.

Tools for Engaging the Public

“Preservation for a New Century” highlights the role that historic preservation plays in the important area of tourism. Historic preservation has the opportunity to engage and educate not just this growing segment of travelers who are interested in experiencing the history and character of their travel destinations, but to also catch the attention of a broader and younger audience of people looking for real-time information about the place where they live or are visiting. Local historic preservation groups could partner with technology providers to deliver information about historic resources that enhances local exploration and the travel experience by creating mobile virtual reality⁴⁰ applications that allow locals and tourists to interact with historic resources real-time and through different types of media, and

⁴⁰ Other terms being used in virtual heritage and technology publications are ‘augmented reality’, the ‘virtual world’, and the ‘metaverse’.

to tailor the experience to their personal interests. And these same technologies should be used to encourage engagement and activism.

Various historic preservation groups have begun to realize the potential of current mobile and smartphone technology to capture the interest of the broader public audience with information and stories about the historic places while they are actually visiting and experiencing those sites and resources. Visitors to the Smithsonian Institution museums and galleries use their smartphones to snap photographs of Quick Response (QR) Codes⁴¹ to access fun and meaningful content about the exhibitions they are visiting, or take a quiz to find out “Are You Smarter than a Curator?” and raise money for Smithsonian programs with each correct answer. Institutions like the Museum of the City of New York are partnering with Historypin to geotag⁴² historical material from their archives to allow more people to experience “what’s near you or explore Collections on the go” through the lense of distinct moments in the past. Users can view layers of historical images superimposed on current sites by going to the internet or by waving their smartphones through the air wherever they happen to be.⁴³ More and more mobile phone guided tour applications are being introduced to help people explore and learn about their surroundings – ranging from simple audio and text guides to the multi-media and interactive experience offered by Tagwhat. And one can envision the impact of future events on a neighborhood, a landscape, or even a country – a new augmented reality application from the Korean Unification Project allows users to view the border landscape “unmarred by the walls of division separating the two nations.”⁴⁴

Projects currently in development which could take the location-aware, interactive, and 3-D features even further are: interactive 3-D maps which allow travelers to input personal interests and travel criteria to refine destination information and itineraries, 3-D ‘visual time machines’ that provide a visual overlay to show how different a street or neighborhood was in the past, how the landscape has change, and what historic resources have been lost or gained, and opportunities to submit user-generated

⁴¹ A quick response code encodes information and is designed to be read by a smart phone camera equipped with a QR Code application.

⁴² Geotag is an open source program that allows users to match date or time information from images with location information from a GPS unit or from a map.

⁴³ Historypin, “Historypin,” Historypin, <http://www.historypin.com/> (accessed August 1, 2011).

⁴⁴ Stephen Vagus, “Korea united through the use of AR technology,” Mobile Commerce News, <http://www.qrcodepress.com/korea-united-through-the-use-of-ar-technology/853447/> (August 2, 2011).

content.⁴⁵ The Graz Technical University in Austria is developing the “Tourist Selection Tool” which will allow the user to interact with a 3-D model of the Steiermark region – as the user selects different parameters ‘embedded’ in the model, potential destinations are highlighted on the map and related images and data are displayed.⁴⁶ The iTacitus smartphone application provides place-specific experiences. Visitors using their smartphone cameras can view superimposed environments – what the Reggia di Venaria palace in Turin, Italy, looked like when it was first built;⁴⁷ and will eventually be able to experience information overlays (images, text, and videos) and acoustic overlays (spatial audio clips), as well as receiving suggestions about the other sites to visit.⁴⁸

The challenge for the future will be to incorporate these different ideas and types of applications into a seamless, multi-layered interactive mobile device that allows the traveler to be spontaneous about discovering the rich histories of local communities and neighborhoods and their unique built environment offerings, and offers different ways to experience them. The applications talk to each other ‘behind the scenes’; the device is capable of learning and contextualizing what type of information is of interest to the traveler and can search for it without prompting, can search for information based on where it is, allows the traveler to participate in a broader travel and community.

How can these new technologies be funded by local historic preservation groups and organizations? They can enter into partnerships with the technology developers and provide research and content for the stories about places. While free applications may be desirable as a way to bring in a new audience, charging for upgrades or special memberships that provide more in-depth information, additional and enhanced features, and rewards may be one way to pay for some of the costs. And small, local businesses could be partners in this venture which would allow them to tap into the market of tourists

⁴⁵ Bruce Sterling, “Augmented Reality and atemporality,” *Wired* (August, 15, 2009), http://www.wired.com/beyond_the_beyond/2009/08/augmented-reality-and-atemporality/ (accessed May 21, 2011).

⁴⁶ This technology is being explored at the Institut für Architektur und Medien at Graz Technical University. Bruce Sterling, “Augmented Reality: Tourist Selection Tool,” *Wired* (August, 15, 2010) http://wired.com/beyond_the_beyond/2010/08/augmented-reality-tourist-selection-tool/ accessed May 21, 2011.

⁴⁷ Bruce Sterling, “Augmented Reality and atemporality,” *Wired* (August, 15, 2009) http://www.wired.com/beyond_the_beyond/2009/08/augmented-reality-and-atemporality/ (accessed May 21, 2011).

⁴⁸ Tracy Swedlow, “App Would Allow Visitors to Europe to See How Historic Ruins Looked in their Heyday,” *Interactive TV* (August 4, 2009), <http://itvt.com/story/5340/bmt-group-fraunhofer-team-smartphone-based-augmented-reality-guide-book> (accessed May 21, 2011).

and visitors who want to support the local establishments and historic buildings that add to the sense of place.

In a recent National Center for Preservation Technology & Training (NCPTT) podcast, virtual heritage expert Bernard Frischer stated that the likely outcome of this new technology would be that “tourists will go more and more off the beaten track because they won’t need guides and preparation;” he also stated that the cost of creating these types of experiences could soon put this technology within reach.⁴⁹ This is great news for smaller and less well known locales because it may make it easier for them to reach potential visitors. This offers historic preservationists the opportunity to tell the stories of their neighborhoods and communities to residents and visitors, who in turn may learn to care about protecting and preserving the historic buildings which are a tangible reminder of those place histories.

The historic preservation community needs to engage with this new technology and seize the opportunity to be a leader in providing historical buildings information through innovative and interactive mobile devices which can engage a broader audience, enrich the understanding of historic resources, and emphasize the importance of these historic resources to the community and the larger public audience. This is also an opportunity to engage local businesses to enhance the community experience and to broaden local support of historic preservation. The more that people and groups learn about their historic sites and places, the more likely it is that they will care about them.

CONCLUSION

Looking forward preservationist must embrace and drive technology for two reasons: to advance professional tools and therefore nurture understanding of resources and collaborative relationships; and to engage a larger, younger audience motivating them to learn and experience the built environment in a different way, hopefully leading them to find value in historic preservation and contribute time and money to the ongoing cause. In order to reach our audience and make our case relevant we need to operate on the same platform as the rest of the world. Individuals in the preservation community need to champion these ideas, waiting for national organizations to develop and dispense these technology driven preservation tools down the ranks will not work. National and regional organizations can use

⁴⁹ Jeff Guin, “Podcast: Bernard Frischer on 3-D Scanning, Rome Reborn and Virtual Ancient Worlds on Google Earth,” National Center for Preservation Technology & Training, <http://www.ncptt.nps.gov/2010/podcast-bernard-frischer/> (accessed June 13, 2011).

their media platforms (blogs, publications, press releases) to publicize the success and innovation of technology in the field. Preservationists must build partnerships that can drive this effort and bring together the field as a unified, current and relevant voice.

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