GIS and Enlightened Location-Based Tourism: An Innovation Whose Time Has Come

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Paper Abstract

This paper will describe the development of an ArcIMS application designed to allow local officials and volunteers to create multi-media databases for location-based "enlightened" tourism information. The application allows users to quickly enter location information based on street maps displayed in ArcIMS. The location point information entered is then linked to uploaded text, images, hyperlinks, and video. The application is designed to help communities build their own location-based data that can be fed to multiple location-aware devices as part of a mobile, electronic tourism effort. The overall program is designed to create layers of location-specific historical, cultural, scientific, and environmental information.

Geographic information systems have always been about location, but most of the information in the world's data repositories cannot be accessed via location-based searches. For some types of data and some purposes this is not a limitation. However, the very idea of tourism is a location-focused concept. Throughout the ages, tourism has been supported by travel books and tour guides. Typically, such guides include maps that are marked so as to link descriptions of places with their location. For the average tourist these guides have certainly served their purpose. However, for the tourist seeking more than a cursory description, for example, of a Louis XIV palace, the typical tour guide is unsatisfactory.

For the more demanding tourist, e.g., one seeking a more information-rich experience, the alternative to "tourism-light" has been to hole oneself up in a library (or more recently in a front of an Internet-connected computer). However, much of the idea of tourism as a location-focused exploration is lost within the confines of the traditional information search within a library or within the first generation of the World Wide Web.

Fortunately, the Web is beginning to acquire some spatial orientation. Specifically, the ability to tie information gathered through an Internet search to one or more specific locations has increased in recent years due to the creation of new applications and services, including:

- Googles News Search that allows one to limit the search to a specific area or set of news media sources located in particular areas

- The development of spatial searching applications that allow one to search for, locate, and get driving directions and phone numbers for retail, business and entertainment places within certain distances from a point. [1]

[1] See: "Wireless Location-Based Searching with Lasoo" http://www.wirelessdevnet.com/articles/lasoo1/ Found: June 9, 2004.

- The Cities of Science website that looks at and describes scientific achievement both past and present in cities scattered across the UK. Seven cities are available for exploration and each holds its own repository of articles. The stated purpose of the applications is to "create a better awareness of city-related activity and encourage users to visit these areas of interest in person."[2]

- Companies such as Webraska (http://www.webraska.com) and GeoDiscovery (http://www.geodiscovery.com) are developing location-based searching technologies that make use of GPS functionality.

Obviously, location-based information and location-oriented searching are ideas that will further the role of GIS in the overall development of information technology in the coming decades. Moreover, it is likely that commercially-oriented location-based technologies will be produced in sufficient quantity and quality to provide for everyday location-focused information needs. However, there is a vast amount of non-commercial information that would increase in value considerably were it to be enhanced with location identifiers. Unfortunately, because much of this information does not have an immediate commercial value, there is a good chance that it will remain un-enhanced.

This paper describes some of the ways in which public and non-profit institutions can potentially partner with the private sector around the concept of **E4-Tourism** (Everywhere Enlightened Electronic Engaging Tourism) to begin to build the infrastructure and tools for enhancing non-spatial information with spatial values.

The product innovation: or **E4-Tourism**

An innovative tourism experience is one that employs new technologies to better manage the knowledge that a tourist needs or desires. Innovative knowledge management for tourism would provide the right information to the right person in the right circumstances or location at the right time (i.e. it would be customized, personalized and localized). Our proposed innovation, building on prior work at the University of Georgia (Watson et al. 2002) has four important elements:

1. **Ubiquity** or the ability to receive information via most any mobile device via any network.
2. **Location-Based** or the ability of the system to feed information that is relevant to a tourist's particular location, and to change the provided information as the tourist travels.
3. **Enlightening** or the ability to enhance the normal tourist experience with in-depth querying or information mining capabilities.
4. **Engaging** many citizens in the production of information.

Americans are highly mobile, and the tourism-entertainment industry is one that employs citizens at all levels of service and one where America has a large comparative advantage. Similarly, universities in the United States are acknowledged leaders in communications,

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[2] Location-based searching in the Cities of Science, Case Study by Costas Mavroudis, http://www.othermedia.com/go/CaseStudy_82.html Found: June 9, 2004.

knowledge production, and archiving. We propose to link these two industry leaders to create an infrastructure of ubiquitous opportunity to learn. Our goal will be to make **tourism in America an experience of unlimited depth of knowledge exploration**. With the proposed infrastructure in place a tourist will be able to:

Explore context-and-place-sensitive, personalized information about the:

- The history and background of a place, artifact, or building, etc.
- The design of an object, building, painting, sculpture, etc.
- The cultural heritage/background of a community or of an artist, engineer, philanthropist, writer, etc. responsible for an item of interest
- Applicable local and state government laws, policies, resources
- The characteristics of the local flora and fauna
- The ecology, geology, geography, and land-uses of the area
- Local places for eating, drinking, lodging, etc.

Project Description

This project is founded on three innovations: next generation tourism software, engaging university students in distributed open source software and infrastructure development, and creating the support and tools for non-profit groups to enhance non-spatial information with spatial values. These are, respectively, product, process, and organizational innovations. The following addresses each of these innovations. innovation

Tapping into a New Field for Innovation: Historically, innovation has been primarily viewed as a process of adopting new manufacturing technologies. In more advance economies, however, innovations of a different sort—ones that involve organizational change and service-oriented technologies—have become increasingly important to economic development, particularly in economies, such as the U.S., that are heavily weighted toward services (Rogers 1983; Piore and Sabel 1984; O'Looney 1991). More recently, researchers have identified knowledge management as a key factor in economic development (Drucker 1999), particularly in the service industries, and as a relatively undeveloped field for innovation (O'Looney 2002). Knowledge management, which involves identifying, structuring, refining, and disseminating the best, most valuable, and most relevant knowledge can be applied to services.

There are numerous well-structured Internet information tools to help a tourist access basic transportation and accommodation needs. However, effective knowledge management innovations for some services, particularly services with a broad scope, have yet to be developed. We assert, for example, that there is little or no effective or innovative knowledge management of the tourism experience. Once the tourist is on the road, he or she is very dependent on pre-network technologies for information (e.g., brochures, display notes, signs, etc.). Observation and “tragedy of the commons” theory suggests that this lack of development may be due to the fact that no one organization is responsible for a comprehensive electronic information service to mobile tourists. Providing comprehensive, in-depth information services to mobile tourists will involve organizing information from hundreds of sources and locations that will change over

time as tourist locations change. Such an innovative service would seem to need to be trans-organizational in structure. At a prior point in our nation's history, the organizational change needed to create such a comprehensive service would present an insurmountable barrier (e.g., the transaction costs involved would be high (Williamson 1985) and the pre-requisites for effective collaboration would likely be difficult to met (O'Looney 1996)). Fortunately, the Internet, relational database, and XML provide for a new model of development—syndication.

A Feasible Organization Model for Innovation: Syndication has been recognized as a strong emerging business model for the private sector Internet (Werbach 2000). It is a particularly effective business model for information goods when the piece in question is part of a larger whole and there are a number of possible distribution points for the information. Syndication is likely to be an effective model for the tourism industry in which numerous stakeholders have information that other stakeholders would be interested in using or supply as a service. An important observation in this regard is that opportunities for syndication tend to be most prevalent in fields where there is substantial standardization of information and transaction procedures. Standardization has occurred in the parts of the tourism industry that are dominated by large industries (e.g., airline and hotel booking). Unfortunately, much of the important information in the tourism sector has not been effectively standardized. For example, individual visitor and convention bureaus will typically have their own systems and information requirements for such things as cultural events, historical sites and facilities, or areas of interest to eco-tourists. Because there is little or no standardization, there is little or no ability to create new products and services from aggregating, rearranging, and customizing information-rich tourism experiences. Our project innovation will help entrepreneurs to create these new experiences through new ways of managing a wider range of location-, interest- and route-specific information, scheduling opportunities, and the related transactions needed to support the tour experience. Our private sector partners have an interest in both the underlying technologies that will be used in these endeavors (e.g., ESRI) and in the ability to improve and expand their tourism-related services (WorldSpan and InterContinental Hotels Group).

Without data standards, it becomes difficult for any agency to set up a syndication service that could, for example, allow one to use a single common information gathering interface to register to participate in an event, acquire tickets or get contact information across jurisdictions, organizations, and agencies. A key activity of the **E4-Tourism** project will be to support the potential for syndication of tourism location-based services by helping stakeholders to take advantage of a standard data model and XML-based standards for data exchange.

Internet-based syndication involves purchasing or acquiring information resources that can then be reformatted for particular audiences and integrated with other such resources so as to produce new, customize, personalized and localized knowledge. While syndication still demands some inter-organizational collaboration to develop, the level of this demand (and the associated organizational change barriers created) is substantially less than would be the case were it necessary to develop a new large-scale organization to serve the same purpose.

While some information syndication efforts have arisen naturally from private sector profit motives (e.g., for weather information), the syndication of "enlightened tourism" information not likely to occur without some public sector involvement as many of the stakeholders and information owners are public sector or non-profit entities that are more difficult to organize and more likely to have problems with purely private sector leadership of an initiative of this sort. By highlighting a student development purpose, organizing the initiative around open source

principles, and emphasizing a role for universities in the public-private partnership, the feasibility of syndicating "enlightened tourism" information is enhanced.

The Basic Innovation Infrastructure

The system will be built on relational database, XML technology, and a flexible content management system (CMS). The database will contain details of tourism sites and events. XML standards will be developed to define the variety of tourism items (e.g., a standard for describing an art gallery) so that third parties can transmit data as XML files to update the database. Output from the database will be in XML format and then married with an appropriate style sheet for the device receiving the information. The CMS will enable various tourism agencies to create a customized face to the underlying standardized database and queries. As a result, the system will be device independent and have the flexibility to meet current and future tourist needs.

The proposed infrastructure will provide location-based services (i.e. services that are dependent on the location of the receiver) to multiple devices based on different levels of capability. For those with a basic cell-phone service, information might be short voice messages served by an XML-programmable voice-based server. For those with Web/text cell phone, more extensive text, audio, and visual information might be delivered. For those with wireless services with GPS, place-related information of a predetermined nature would be automatically provided when the device was place in "tourism" mode.

Concrete Example of Use of the Innovation

A cell-phone equipped tourist has signed up for the Georgia Historical Tour, a specialized tour that provides detailed historical data organized by period, events, culture, architecture, and people. In signing up, the tourist agrees to allow the cell-phone company to provide location information to a server. When the tourist turns on the service, she receives historical information relevant to a chosen distance and personalized query from the tourist (e.g., all events between 1860 and 1890 within 10 miles).

Sample Content Development for Scenario 1: In conjunction with the Georgia State Archives, the Georgia Historical Society, and the Georgia Historical Marker Commission, an XML data schema is developed. Content from historical documents, papers, records, etc. are marked up for the specified categories (e.g., people, events, dates, etc.) The data are uploaded to a database, and made available as requested by the tourists prior, during, or after a trip in a format appropriate to the access device.

While the preceding example is Georgia-based, the proposed technology will be location independent and could be used anywhere within the U.S. or the world.

Key Project Activities

As the preceding scenario suggests, we propose to develop the infrastructure that would enable information-and-service-rich tourism that can range from an area or region-based service to one that goes down to a specific object in particular place. The key objectives of the project will be to:

- Develop an open source, Java-based CMS (TourCMS) that will allow for broad participation by content providers to create a critical mass of information. It is assumed

that in many cases, the information already exists, and will only need conversion for standardized data exchange.

- Build the partnership so that the proposed services are sustainable (e.g., by identifying possible self-funding or fee structures for tour sites or tourist micropayments for information).
- Develop and test individual technologies as well as how they might be integrated to provide location-based services to tourists.
- Write software to parse XML documents to insert and update a tourism database.
- Develop ways that insure that tourists and students have the opportunities to deeply explore content areas (e.g., links to digital libraries and other resources).
- Develop the customer base through testing different marketing schemas in all phases of tourism: planning, touring, and reminiscing {Watson, 2004 #2376} (e.g., tourists could be allow to use/rent a device upon entering a state/locality).
- Development of a tool to allow non-programmers to add location information to existing data or media.

Background on Location-Based Services

The potential for providing location-based services is based on the widespread availability of wireless networks and devices to handle location-based information. The growth in these services will depend in large measure on the size of the expected market. Fortunately, because the Federal government has required mobile phone service companies to provide location information for emergency 911 services, the availability of location information for mobile phones is expected to be widespread within a couple of years. As of early 2004, no major U.S. mobile teleco had yet provided the location-based service infrastructure for general commercial development, but most promised the availability within a few months to a few years. European and Asian telecos are further advances in this area. Mobile telecom providers have generally agreed that when they provide location information, the will do so as part of a standard protocol (i.e., Mobile Location Protocol (MLP). As a consequence, application developers are in the process of developing software that will access and use location information.

Process innovation

Market economies center their activities on wealth creation, and foster markets and hierarchies because they are efficient wealth builders. The success of market economies depends on their ability to continue to create customer value in a competitive global environment. A major source of the talent that they need to remain successful is the higher education system. Ironically, most of what students produce while in graduate school is ‘thrown away.’ Assignments are usually discarded once completed, with the exception of the doctoral thesis. In effect, society discards much of the work of its most important next generation of wealth creators.

The process innovation is use students to develop the necessary elements of a tourism information system. Students have already developed important elements, as documented later in this proposal, of the system. Thus, we have evidence the process can work. We still need to learn how to scale the process to engage students in a wide variety of classes and countries. We also need to discover how to ensure that the software meets quality and assurance standards. All of

these issues, and others that occur in software development present opportunities to engage students in solving these problems.

The proposed process innovation has value well beyond this project. As we learn how to engage students in wealth production and change societies' mindset about education, we will release a large latent resource.

Administrative innovation

Wasting wealth creating intellectual resources can be reduced if we create administrative infrastructures to support international community projects that simultaneously support learning, wealth creation, and development of cross-cultural skills. It is our intention, through this research project, to demonstrate an innovative infrastructure for education and to learn successful practices to support this infrastructure.

Business schools rarely operate science-like laboratories. They tend to study wealth creation rather than participating directly in its production as the science disciplines do. To operate successfully, laboratories need an infrastructure, and the plan is start with a small support system to facilitate the product and process innovation. Thus, the project seeks funding to hire a project manager and marketing officer to support software development and implementation, respectively. The project manager will synchronize activities across multiple classes and coordinate design and maintenance of the system's information architecture. The marketing officer will promote the project to universities (to recruit students to work on the project), tourism agencies (to install the software), and data sources (to provide data for the database).

History of the project

This project started in January 2003 in an XML class at the University of Georgia. A class of 50 seniors and graduate IS students was organized into a "software company" of multiple teams under a matrix structure (e.g., some students reported to both a project manager and technical specialist). Each team was charged with developing a data model to describe a given tourism object or event in Georgia. The individual data models were merged to create an overall data model. Each team then developed an XML data schema to describe its portion of the data model. Again, the components were merged to create an overall XML data schema. Finally, a simple system was developed to show how XML documents and style sheets could be used to generate a tourism information Web site.

As a result of this class, we learned several things. *First*, we realized we had a project that need not be discarded at the end of the semester, as most are, but could be continued in other classes to create something of considerable value to the community. *Second*, we discovered that students responded very positively to the idea that their work would have enduring value. *Third*, the idea of having globally distributed students collaboratively working on a common goal emerged from discussing the project with other faculty. Subsequently, three classes at Georgia State University and one at the University of Nantes investigated different aspects of the future of tourism.

Consequently, we decided to create an open source project, the Open Tourism Consortium (OTC), to develop the next generation of tourism software based on location-based services {Watson, 2004 #2376}. We registered www.opentourism.org, set up a server, and established a Web site for sharing project information among the OTC participants. Because we realized we would face issues of governance, leadership, and management (GL&M) in running OTC, we created, in fall 2003, a research team of two faculty members and four graduates students to

study these issues. This team has produced five conference papers and has one journal article under review. We have applied for an NSF grant to fund a lengthy study of GL&M in digital communities.

In the past several months, a team of five Masters of Internet Technology students and a class of XML students at the University of Georgia commenced work on TourCMS. We now have :

- TourDM 1.0 (the data model)
- TourML 1.0 (the markup language) {Seibold, 2004 #2561}.
- An open content textbook (http://wikibooks.org/wiki/XML)

With the software architecture defined and a thin slice of the software written, there is now enough to show how TourCMS will work when completed.

Other classes will continuously improve the book and an invitation has been extended to IS scholars to use the text and engage their students in its constant development.

In addition to the development of data exchange standards and content management infrastructure, the project has also developed prototype, web-based GIS technologies for engaging community volunteers in the creation of location-based information and in tying location information to a variety of content, including rich media. Specifically, faculty at the Carl Vinson Institute of Government have created a web-GIS application (E-Tourism GIS) that allows non-technical users to click on a location on a Internet map so as to automatically store the map coordinates and then to associate those coordinates with multiple resources such as web pages, text, pictures and audio and video files.

The E-Tourism GIS application was developed using ArcIMS and employs the acetate layer capabilities of the ArcIMS html client. Sample code for use of the acetate layer to allow users to add new data was drawn from a demo application created by Bryan Baker from the ESRI California Regional Office.

Description of E-Tourism GIS

E-Tourism GIS is an ArcIMS application for identifying and exploring places with historical, cultural, and ecological value. And it is an application that allows citizens to contribute to the knowledge base about these places.

On arrival at the E-Tourism Map, you are in a **Viewing Mode**. In this mode you can use the Icon tools to Zoom In, Zoom Out, Identify, Pan, Query and Login for editing. However, you cannot use the actual editing tool to add a place of interest or edit its values until you have logged in for editing.

 **Zoom Out**

 **Zoom In**

 **Zoom to Full Extent**

 **Identify (use this tool to click on a point and return information about the point)**

Pan

Query

Login

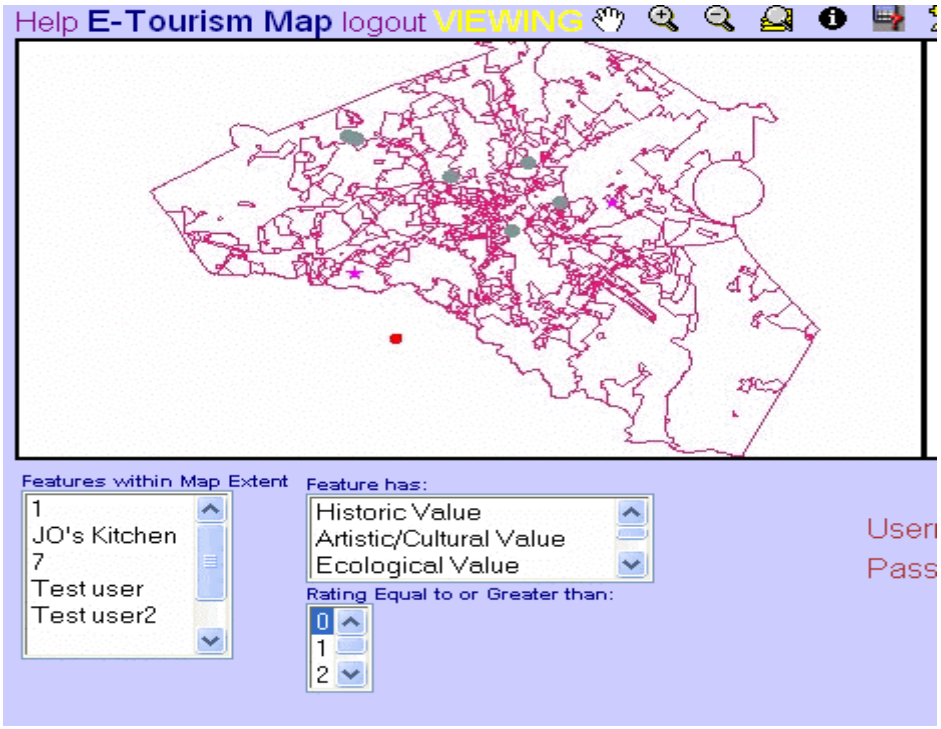
Edit feature Used to add a new point and enter the Longitude/Latitude info about points. (Must be logged in as an editor--Does not work in Viewing Mode)

Viewing Mode

In the Viewing Mode you can return information about the features in three ways:

By choosing from a List box (at the bottom of the map) of features that are in the current map view (**Features within Map Extent).**

1. By clicking on the Identify tool and then click on a point on the map. (When you click on a feature you should see it highlighted on the map).
2. By click on the Query tool and choosing the group of features/locations that you want to see information on (as well as see highlighted).



When you choose feature in one of these ways, you will bring up the information (in the frame on the right side of the page) about the feature as well as a related website. At the bottom of the feature information is a 'Zoom To' button that when clicked will redirect the map to the point where the feature is located.

To Return to the Viewing Mode: Click the Login Icon and type the User Name: logout and Password: demo . The page will reload and indicate that you are in the Viewing mode.

demo

Create New Database Feature

Upload Picture

* = Required Field

X (LONG)*	2542487.500784658
Y (LAT)*	1442285.9783944413

(use Feature-location tool to set/update x/y)

ID1	
PLACETYPE	Artistic/Cultural Value
Subtype	
Era	
EXPIRES	
Rating	
Notes	
Street	
City	
State	
Zip	
Country	
Nrating	1
Picture	0161-usa.jpg

Artistic/Cultural Value
Ecological Value
Recreational Value
Value to Children
Value to Seniors
Ethnic Interest
Cultural Value
Commercial Value
Religious/Spiritual Value
Very Cool
Crime Problem
Trash/Graffiti
Hazard
Ecological Problem

Add Record

Editing Mode

To enter the editing mode click on the Login Icon. A form will appear below the map for entering a User Id and Password. If your login information is correct, the page will reload and the map and the title area of the page will now say "Editing" in a yellow font.

When in Editing Mode, there things happen:

1. The list of **Features within Map Extent** will be replaced with a new list of **Features You Can Edit.**
2. The map will only display the point that the user/author has added to the database.
3. The query capability is turned off.

In the editing mode, the user can either get information about the locations they have authored or add new points or edit existing points.

To add a new point, you will need to first click the edit feature icon **.** When you do so a form will appear to the right. To set the location (or the X(Long) and Y(Lat) values, you simply click on the map where you want the point to go. If you need to move the map, click on the other tools (e.g., Zoom In, Pan, etc.) until you can find the point, then click on the edit feature icon again and click on the map. The location values will be entered automatically.

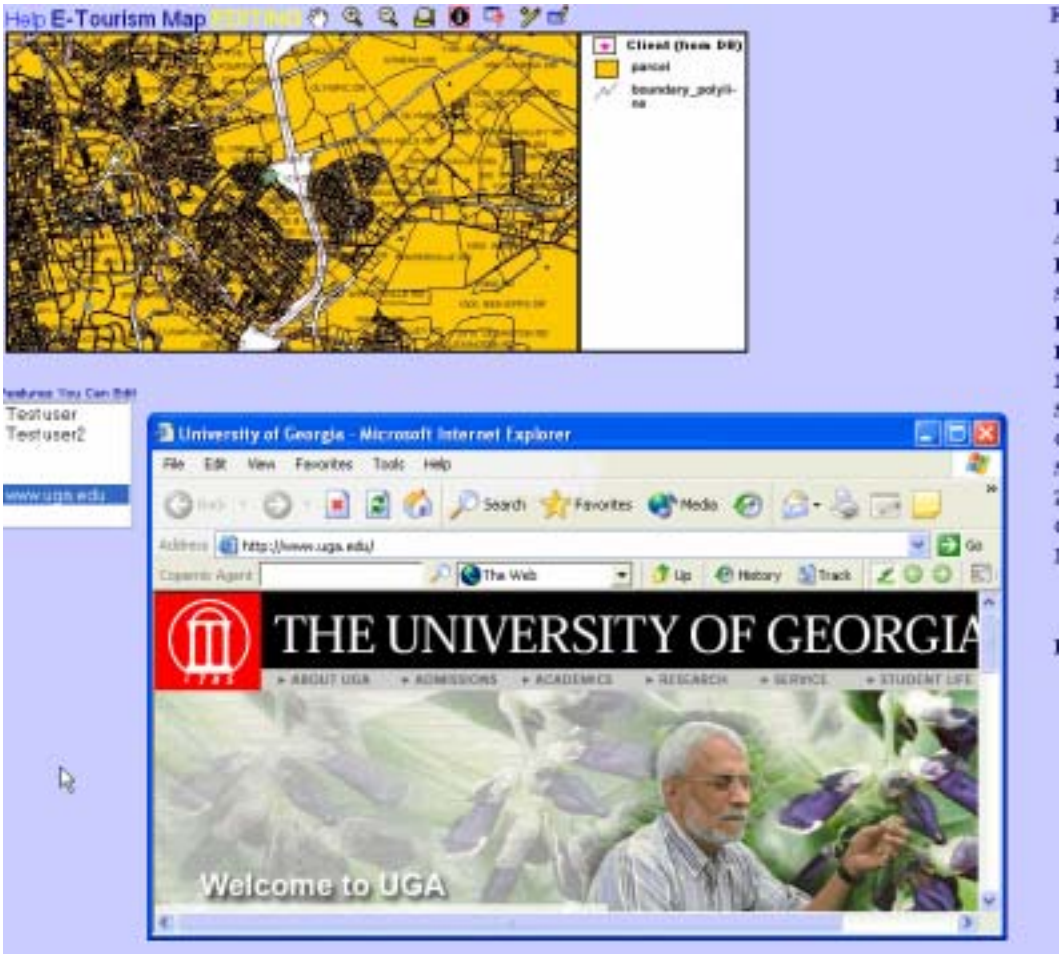
To Add a Picture to the location information: You can include a picture with the location information by choosing from the dropdown list of pictures. If you have a picture of your own that you want to include you need to first upload the picture to the server.

IMPORTANT TIP: Upload new pictures **before** filling in any other information as form needs to be refreshed in order to list the new picture you have just added to the server.

To Upload new pictures to the Server: Click on the "Upload Picture" link. This will take you to a grey form that has a "Browse" button on it. Click the Browse button. This will open up a window to your computer's files. Maneuver to the area on your computer where your picture is stored. Choose the picture. The picture name will now be in the grey page form. Click the "Submit" link. You should receive confirmation that the picture has been successfully uploaded to the server.

To Edit Existing Points, you simply choose the point (from the Features You Can Edit list) or through the Identity tool and clicking on the point on the map. When you do these things, the information about the feature point appears on the right. At the bottom of the information are three buttons: Zoom To, Edit, and Delete. Use the Edit button to return the edit form.

To Return to the Viewing Mode: Click the Login Icon and type the User Name: logout and Password: demo. The page will reload and indicate that you are in the Viewing mode.



In summary, the project has been operating for nearly 1.5 years and has delivered four products: TourDM 1.0, TourML 1.0, XML textbook, and a web-based GIS data input system for use by community groups. TourCMS development has started, but needs considerably more work before it can be implemented.

The long-term goal

The goal is to spin-off system service businesses operated by students who have participated in the project. While the software will be free, those who opt to download it will need supplementary services to help with installation, loading data, educating staff, marketing, and so forth. Currently, 'professional open source' firms, such as JBoss, have demonstrated that such a model can be profitable.

The Innovation Challenges

Won't the problem of interoperability make the project impossible?

A number of organizations concerned with geospatial data and services now have a location-based service initiative to create standards for such services. The project will attempt to address interoperability issue in two ways. *First*, the project will work with content providers to insure that the necessary standards for content delivery to specific locations have been met. *Second*, the project will work with private sector partners (e.g., WorldSpan and InterContinental Hotels

Group) that have a keen interest in developing tourism. *Third*, the project will publish under an open public license the technology (i.e., XML standards and software) it develops.

Won't large nation-wide commercial providers be expected to develop these services on their own?

Maybe yes, but probably not in the short term, for both technical and commercial considerations. Technically speaking, trying to consolidate all location content into a single database poses some costly operational issues. Typically, the most current and best content is distributed across many systems. As a result, it is better to leave location content in local, distributed database and then use data exchange standards (i.e., XML) to regularly consolidate these distributed holdings. Commercially speaking, a large proportion of the content we expect to provide may not have stand-alone commercial viability for three reasons. *First*, some of the content will be educational in nature. *Second*, much of the information will be in the public domain, so commercial entities would have trouble charging for it based on exclusive rights. *Third*, while the total location-based tourist service itself may provide for financial profits, the individual facts and object in the database (e.g., that the area to one's right is a sanctuary for birds of a particular species) may be expensive for a commercial entity to collect, but would be willingly provided and maintained by an engaged volunteer for a publicly operated venture. Just as the current Internet itself was built on chiefly public-and-non-profit-sector-funded activities, which blazed a trail for commercialization, so too we can expect that numerous commercial firms will be able to learn from and piggy-back on the project's successes.

What about privacy considerations?

Tourists will opt to receive the service and specify what the tourist items of interest. The database will not maintain details of what a particular tourist requested. Aggregated data will be maintained for analysis to improve the service.

Why do you believe the project will stimulate economic growth?

As with other services, the U.S.'s competitive position in tourism is likely to depend on innovation and increased efficiency. Because many of the elements of tourism are based on physical human activity that are difficult to automate (e.g., cleaning hotel rooms), advanced economies are at a major disadvantage because of their relatively high wages. In cases where a competitor is disadvantaged by labor costs, often an effective strategy is to redefine the service itself, providing a premium service at a reasonable price. E4 Tourism represents such a category-breaking up-grading of the traditional tourism service. **As an innovation that changes the very nature of the service,** E4 Tourism can help to maintain and expand the development of the tourism industry in the United States.

Moreover**,** E4 Tourism has a potential to fill an important gap in Georgia's and other states' development. As the report of the Governor 's Commission on Georgia History and Historical Tourism argues: "A significant portion of Georgia's continuing population growth since the 1960s has come from residents of other states and countries moving to Georgia. Over half of the residents of the Atlanta metropolitan area were born in another state. Today, many of Georgia 's residents have never taken a course in Georgia history and consequently know little about the state 's past. A 2003 Peach State Poll found that 81 percent of Georgians are concerned that citizens today don't know much about their state's history."

Tourism is Georgia's second most important industry, generating $2 billion to the state and 200,000 jobs in FY 2001. Studies have shown that specialized "enlightenment seeking" tourists such as heritage tourists are better educated, stay longer, and spend more money than other tourists. As a result, these kinds of tourism offer tremendous potential to generate revenue and economic development throughout the state. But, it is especially important in those small counties that have no major museums, state or national parks, lakes, or other attractions associated with traditional tourism. A major state initiative to promote E4 tourism could serve as a Marshall Plan to rural Georgia, generating increased spending, tax collections, jobs, and quality of life

Such a plan is of crucial importance to many counties in the state are still plagued by "persistent poverty" (91 Georgia counties not part of the Appalachian Regional Commission have been designated as constituting such a region). Some particularly impoverished Georgia counties would rank as "third world " areas if they weren't located in the United States. Despite the lack of jobs, infrastructure, and economic resources, most of Georgia's poorest counties share one thing in common – a rich legacy of history. No matter how poor, every Georgia county has a courthouse, numerous historic structures and sites, cemeteries, statues and monuments, historical markers, land records, and other resources that if properly marketed could attract visitors interested in history and genealogy. Current technologies, such as GIS and GPS, can be used to generate both physical and online maps showing the location of heritage sites to not only a national but international audience. Also, the Internet allows creation of an online, searchable Web site that can allow anyone to quickly find the identity and location of sites on any topic related to Georgia heritage. A key aspect of our proposal, taking a page from Gerschenkron (1962) on the potential advantages of backwardness, is to help a set of impoverished counties begin to leapfrog technologies. Rather than simply helping these counties to inventory their historical, cultural and eco-tourism resources, we want to provide them with an infrastructure to serve the next generation of intelligent devices.

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