MapGeo, NRPC’s Live Maps App

URISA Exemplary Systems in Government (ESIG) Award Application

Prepared by: Sara Siskavich, GISP
4/18/2014
April 16, 2014

Urban and Regional Information Systems Association (URISA)
Exemplary Systems in Government (ESIG) Award Committee
701 Lee St., Suite 680
Des Plaines, IL 60016

Dear Sir or Madam,

On behalf of the Nashua Regional Planning Commission (NRPC) I respectfully authorize our application for the URISA Exemplary Systems in Government (ESIG) recognition. Thank you for your consideration of MapGeo, our Live Maps App, for your prestigious award in the category of single process systems that result in extended or improved government services.

Sincerely,

Kerrie Diers, AICP
Executive Director
A. System Overview

1. Name of system and ESIG™ category for which you are applying (Enterprise System or Single Process System)

MapGeo, NPRC’s Live Maps App – Single Process System

On the Web at: www.mapgeo.com/nrpcnh/

2. A letter from the executive administrator authorizing submission of the system application

Please see previous page

3. One (1) page, or less, summary of what the system accomplishes and why it is exemplary

Over the course of several decades, the Nashua Regional Planning Commission had developed and maintained an exceedingly accurate and regionally-consistent, multi-purpose GIS parcel basemap to support regional, transportation, land-use, environmental planning in the Nashua region. Historically, awareness of this valuable regional information resource had been limited to a small community of GIS practitioners, local and regional planners, and some town staff, and municipal access to NRPC’s GIS had traditionally taken the form of ad-hoc requests for maps, custom analysis, or more rarely, GIS data.

In a climate where regional planning commissions in New Hampshire are under increasing pressure to illustrate their purpose and value to their member communities and the public, NRPC sought to extend the reach of its GIS through the establishment of a public-facing, self-service GIS web presence.

The concept of a GIS online property viewer isn’t novel. Technical implementation is generally straightforward, the associated financial investment is relatively low, and the benefits to communities and the public has been repeatedly demonstrated through numerous existing examples. The NPRC project is notable because of context: NRPC is the first and to this point, only regional planning agency in New Hampshire to implement one. To our knowledge, this is the only public-facing parcel viewer in New Hampshire that crosses government jurisdictions. Therefore this application has less to do with technology and is more about NRPC’s implementation path across 13 communities to bring this project from conceptual idea to implementation reality.

4. Three “user testimonials.” These testimonials should include the title of the system, the person’s name, job title (if relevant), a statement of what specific ways the system improves their work and/or the work of their organization, and how frequently they use the system

Please see next three pages.
Dear URISA ESIG Committee,

Please accept my endorsement for the Nashua Regional Planning Commission’s application for the Exemplary Systems in Government Committee award. In my role of Community Development Director for the Town of Amherst, I am responsible for the Building, Code Enforcement, Planning, Zoning and Economic Development Departments, including the Planning Board, Zoning Board of Adjustment, Conservation Commission, Historic District Commission and Heritage Commission.

I supported the idea of MapGeo immediately upon hearing of NRPC’s plans for implementation because I knew it would be an extremely valuable tool for staff, citizens and volunteers across Amherst and the region. In my capacity, I access MapGeo about ten times per week. My department uses MapGeo every day in a variety of capacities, from verifying if a building permit application for an addition is outside of zoning setbacks, to working with an interested buyer on a property’s redevelopment potential.

We have established links to MapGeo on our Community Development and Assessing web pages: these two links alone referred 44 unique visitors in March and 136 unique visitors in April. Prior to MapGeo, each of these visitors would have been required to come to town hall to view the same information in paper-based form; the corresponding reduction in counter traffic translates into direct productivity gains on the part of Town staff.

In conclusion, I would like to share some testimonial comments from other users in Amherst:

I can vouch for the (former) pain of skipping among three websites and a database just to figure out who owns land of interest adjacent to our conservation parcels... we hope to make serious use of MapGeo. --John Harvey, Chair, Amherst Conservation Commission

MapGeo won't eliminate the need for shapefiles that detail other aspects of the land... but I admit that it's going to save me time... MapGeo gave me a nine-member abutter list in the time it previously took me to track down each list member--A superb resource! --Bill Wichman, Amherst Conservation Commission

Just wanted to let you know that our Assessor is extremely happy with the MapGeo; he wishes we had it years ago. --Michele Crowley, Assessing Assistant, Town of Amherst

Sincerely,

Sarah Marchant
Community Development Director
Re: MapGeo, NRPC’s Live Maps App

My name is Dave Hennessey and I am the manager of Coldwell Banker Residential Brokerage, Amherst NH office. We have 40 real estate agents working out of this office and our marketing area neatly coincides with the coverage area of the Nashua Regional Planning Commission (NRPC).

We have access to many of the maps and features of the MapGeo system—zoning; flood zones; assessors maps and we frequently link to the vision appraisal site that Mapgeo also provides a link for. However there simply is no single site where we can access all of the above except through Mapgeo. We are finding this site saves us a lot of time when listing property for sale but even more importantly, because it is a public site, it allows us to share the information with our buyer clients. By putting all this information into a single web site with public access it has simplified the home buying process for many of our customers who are increasingly diligent in researching potential homes to buy. In summary, it has allowed us to share accurate and complete data on the listings we are selling and on the homes we are presenting to our home buyers. It is a terrific resource.

Dave Hennessey, GRI, e-Pro
Vice President
Coldwell Banker Residential Brokerage
103 Ponemah Road, Amherst, NH 03031
(603)673-4000
FOUGERE PLANNING & DEVELOPMENT Inc.
Mark J. Fougere, AICP
253 Jennison Road  Milford, New Hampshire  03055
phone: 603-315-1288      fax: 603-249-9314
email: Fougereplannng@comcast.net

April 16, 2014

To whom it may concern,

I am a certified planner and have occupied numerous local government positions in New Hampshire over the last 24 years including Milford Planning Director and Deputy Planning Director for the City of Nashua. For the last 13 years I have operated my own consulting company serving both the private and public sector.

My current capacity is that of consultant who provides town planning and construction oversight planning in several communities in the Greater Nashua area, I am writing this letter supporting NRPC’s Live Maps website.

I have referred the site to many other consultants, members of the local boards and commissions, along with numerous private sector groups. Although a few towns in the area do have GIS capability, this site provides one site serving our entire region, including numerous towns that previously did not have this capability. Fast, easy access to valuable land use data without having to leave your computer is incredibly convenient and obviously earth friendly. A car trip that could take 45 minutes to visit a town hall now can be done without a car.

Personally I’ve used the site in the following ways: Viewed aerial photos and tax map sections of areas of a community, printed out maps of areas and individual lots, viewed wetland data, abutter and ownership information all in the last two weeks. This tool is and will be an invaluable tool for me and many others in our area for years to come.

Respectfully,

Mark J. Fougere

Mark J. Fougere, AICP
President
Fougere Planning and Development, Inc.
C. System Design

1. What motivated the system development?

In 2013 the Nashua Regional Planning Commission took a critical look at its existing website and initiated a massive redesign and content overhaul. The Commission convened a website subcommittee who advised that the online provision of valuable data and information should be central organizing principle in the new website. Implicit in this directive was the expectation that the new website should be inviting, user-friendly, and offer self-service information resources that highlight the NRPC’s reputation of being a nexus of planning data and information in the region.

With respect to interactive mapping, the NRPC had dabbled with free, open-source frameworks and had established a popular, well-trafficked interactive viewer for a database of traffic counts. This viewer provided a practical example of the potential value of an online, interactive GIS to NRPC.

While considering the needs of the Commission, NRPC also recognized that at the time, only two of NRPC’s 13 communities had substantial and ongoing resource commitments to support town-wide GIS implementations at the local level. In other words, the NRPC GIS was the de-facto GIS landbase for the greater Nashua region. There existed the perfect opportunity, in the context of the redesigned NRPC online presence, to create a web GIS system that served both the needs of the Commission as well as our member communities.

2. What specific service or services was the system intended to improve?

The specific workflow supported by MapGeo is the viewing, querying, and authoring of maps with authoritative local GIS data, using the NRPC parcel fabric as the most granular geographic unit in the database. Any regional or local question that involves specific land parcel characteristics can be
potentially informed through the use of MapGeo. With this application, any local government process that formerly required parcel lookups on property or tax maps can rendered more accurately and efficiently.

3. What, if any, unexpected benefits did you achieve?

NRPC’s online GIS revitalized the dialogue between the NRPC GIS program and our communities. A technical conversation about the data and functions in MapGeo can quickly evolve into an exploration of unmet needs for GIS and the brainstorming of creative solutions. Indirectly, the visibility of MapGeo has promoted a better understanding of NRPC’s organizational role and service offerings.

On a technical note, NRPC chose this particular vendor solution in part due to its intuitive interface, and we were aware that staff with some fluency in desktop GIS would naturally transition to the online tool for quick queries. Unexpectedly, executive level personnel have willingly become “hands-on” with MapGeo also.

A pleasant surprise has been the ease in which the tool functions on tablets over 3G or LTE cell data connection. This greatly expands the reach of the NRPC GIS to field personnel such as DPW and first responders, many of whom lacked access beyond NRPC’s prepared paper maps formerly.

4. What system design problems were encountered?

NRPC went out to bid for a website redesign and several geospatial “flagship” applications that emphasized the unique strengths of the NRPC GIS, namely, its parcel and transportation-related data. NRPC drew distinctions in the RFP between these project phases but treated the entire project as a single system overhaul. Eventually, the website redesign portion of the project was separated from the GIS component of the project and each piece was implemented separately by expert solution providers in these areas.

5. What differentiates this system from other similar systems?

Approximately six years ago the New Hampshire Department of Revenue Administration (DRA) and the Technology Transfer (T²) Center at University of New Hampshire initiated a statewide parcel data collection effort called the New Hampshire Parcel Mosaic Map. NRPC contributed parcel data to this project. NRPC’s Live Maps project is most certainly the indirect beneficiary of the Parcel Mosaic project, in that it introduced the idea of a continuous parcel fabric across local governments and prompted communities to examine and establish data distribution procedures for their data. At this point in time, however, the Parcel Mosaic Map interface is only accessible to some public agencies that have signed an agreement. NRPC’s MapGeo, by contrast, is on the Web as an unrestricted service to both our communities and the public.

A significant portion of the NRPC is region is small-town rural. In our region, actively maintained, community-specific online GIS systems are the exception rather than the norm. NRPC’s MapGeo makes online mapping available with logically-consistent datalayers across our region such that analysis can
extend across town borders, and offers this valuable functionality in a no-added cost, user-friendly package to communities where GIS has been historically out-of-reach or difficult to maintain.

**D. Implementation**

1. **What phases did you go through in developing the system?**

The overall implementation can be divided into a pre-launch phase and a post-launch phase. The process was far from an orderly series of sequential steps; rather, communications, education, and technical activities tended to occur in tandem, and their nature evolved as we progressed along the timeline.

NRPC made stakeholder awareness the top priority throughout the project. First, NRPC circulated a one-page summary of the system’s base functions and proposed data content to Commissioners, senior town staff, and Boards of Selectmen. To emphasize the feasibility of the project and its local relevance, NRPC created a pilot application populated with “demo” GIS and assessing data pulled from the NRPC project files. NRPC demonstrated the pilot to town administrators, senior municipal staff, and Boards of Selectmen to further raise awareness and collect feedback on system content and configuration. As NRPC implemented changes based on feedback, the pilot evolved into what became a functional “beta.”

The last step prior to launch was a full data reload based on updated data cuts from the municipalities.

The communications campaign continued once MapGeo went into production. NRPC promoted the site during Commission meetings and through email and social media. At the request of communities, NRPC tailored and expanded the Live Demonstration from the pre-launch phase and scheduled a series of hour-and-a-half training demonstrations on-site in our regions Town Halls for town staff and boards and committees. The user feedback collected during these sessions will inform the next database update of MapGeo.
2. Were there any modifications to the original system design? Why? What?

This project was based on a commercial project and therefore system design choices involved data content and symbology as well as a number of pre-packaged configurations. Initially NRPC presented to our Boards of Selectmen and/or town administrators a pilot implementation with all possible data and functionality exposed through the public-facing interface. The following issues arose:

*Management of potential asynchrony between MapGeo and online assessing databases.* Owner and deed recordings are the most dynamic pieces of the MapGeo database that also exist in town-maintained property-record card databases. It was not practical to sync the refresh cycle of MapGeo with these multiple external sources. As a resolution, NRPC wrote additional metadata into the disclaimer and system export products that clearly indicate the vintage of data records, on a town-by-town database.

*Data update interval may not adequately support abutters list function.* The current NH practice is that applications to town Boards frequently require an abutters list that is current to within five days. Furthermore, the responsibility for accuracy generally falls to the applicant. Because NRPC could not guarantee near real-time database updates, NRPC removed the abutters list function from the public interface.

*Establishment of an assessing data update process across communities.* Initially, NRPC presented a Memorandum-of-Understanding (MOU) to each of our communities outlining the functions of the system, the data requirements, and a suggested process and timeline under which communities would provide a regular transfer of assessing data to NRPC for the system. Rather than facilitate a partnership, which was the original intention of the MOU, NRPC found that it actually created confusion and imposed unnecessary formality to the process. NRPC quickly changed the approach and agreed to make a simple yearly public records request to the assessing staff in each community for the data.

E. Organizational Impact

1. What user community does the system serve and how?

This system is primarily designed to streamline the business of local and regional government. The primary users are office staff and boards/committees that facilitate general town clerical work, assessing, planning, conservation, building, historical/heritage resources, public works, and emergency preparedness. The public audience has included real estate professionals, media, consultants, private sector GIS community, and citizen activists.

2. What are the ultimate decisions/operations/services being affected? If appropriate, provide a few examples including, but not limited to: screen input/output forms, paper products, or other descriptive graphics.

The effects of MapGeo include streamlined workflows that were formerly paper based, an increase in the overall accuracy of geospatial queries and analysis, and an increase in self-sufficiency across the stakeholder audience.
The following is a current tax map from one of our communities. The map is difficult to read, and the parcels lack address information.

By comparison, here is the same neighborhood depicted in MapGeo. The user has executed a search by address, obtained owner information on multiple parcels, and determined the parcels’ proximity to flood plain.
3. What were the quantitative and qualitative impacts of the system?

The following table presents monthly web statistics since the launch of MapGeo in early February 2014.

<table>
<thead>
<tr>
<th>Metric</th>
<th>February 2014</th>
<th>March 2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Visitors</td>
<td>714</td>
<td>1009</td>
</tr>
<tr>
<td>Peak Number of visitors on any one day</td>
<td>101</td>
<td>72</td>
</tr>
<tr>
<td>Average visitors per day</td>
<td>38</td>
<td>32</td>
</tr>
<tr>
<td>Average time spent on the site</td>
<td>13:39</td>
<td>19:01</td>
</tr>
<tr>
<td>Average page views per visitor</td>
<td>38</td>
<td>46</td>
</tr>
</tbody>
</table>

The system is still young, and NRPC will continue marketing and educational activities with the goal to increase the total visitors per month and average visitors per day. What we do know, however, is that our current audience is highly engaged based on the time they spend on the site and the number of pages viewed per visit. If we assume each of these visitors were spending a comparable amount of time working with a government staff person, a quick back-of-envelope calculation suggests that the application has already resulted in a significant return-on-investment.

\[
\text{Total Visitors} \times \text{Average Visit Duration} \times \text{Municipal Staff Rate} = \text{Total Cost Savings}
\]

\[
1723 \times 0.27 \text{ hrs.} \times 75 = 34,891
\]

Qualitatively, the support and maintenance of MapGeo has been “good for business.” It has greatly influenced the focus and prioritization of the NRPC GIS group. The parcel landbase is now subject to a new level of scrutiny which has resulted in an increase in feature, attribute, and topological quality control. The increased visibility of the database has resulted in an uptick in data requests and custom map and analytical products.

4. What effect has the system had on productivity?

As stewards of the parcel database, NRPC’s main productivity gain can be measured by the speed in which we can respond to requests involving parcel-based data. A response involving a basic map might take at least an hour of staff preparation time, whereas now we can perform a query, generate a map, and send the result via an email in a matter of minutes. As discussed in the previous answer, the time savings have been reallocated towards activities that increase the quality and creative utilization of the GIS.

5. What, if any, other impacts has the system had?

The establishment of this system is a clear statement that NRPC is committed to developing GIS as an efficient, transparent, and valuable public resource.
6. How did the system change the way business is conducted with and/or service delivered to clients? Give specific examples comparing the old way with the new.

For NRPC, the implementation of this system was an entirely new service offering, which minimized the organizational impacts on the way our existing business was conducted.

F. System Resources

1. What are the system’s primary hardware components? Give a brief list or description of the hardware configuration supporting the system.

The application is hosted on Amazon’s Elastic Compute Cloud (EC2). Client hardware includes PCs and/or tablets.

2. What are the system’s primary software components? Describe the primary software and, if a commercial package, any customizations required for the system.

The application’s framework is based on the Postgres/Postgis/Geoserver/Leaflet stack. The application can be accessed from one of four popular web browsers (Internet Explorer, Firefox, Chrome, or Safari). No other client installations or plug-ins are needed.

3. What data does the system work with? List and briefly describe the database(s).

The data contributions from outside organizations cannot be overstated. Outside of data developed by NRPC, the database contains thematic datalayers from NRPC, New Hampshire Granit, MassGIS, New Hampshire Department of Transportation, Massachusetts Department of Transportation, New Hampshire Department of Environmental Services, FEMA, USGS, and several open-source providers:

<table>
<thead>
<tr>
<th>GIS Datalayer</th>
<th>Data Originator</th>
<th>Data Steward(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NH Regional Planning Commission Outlines</td>
<td>NRPC</td>
<td>NRPC</td>
</tr>
<tr>
<td>Major Routes - NH</td>
<td>NHDOT</td>
<td>NH Granit</td>
</tr>
<tr>
<td>Major Roads – MA</td>
<td>MassDOT</td>
<td>MassGIS</td>
</tr>
<tr>
<td>Local Roads</td>
<td>NRPC</td>
<td>NRPC</td>
</tr>
<tr>
<td>MA Regional Planning Agencies</td>
<td>MassGIS</td>
<td>MassGIS</td>
</tr>
<tr>
<td>Town Facilities</td>
<td>NRPC</td>
<td>NRPC</td>
</tr>
<tr>
<td>Conserved Land - NRPC</td>
<td>NRPC, NH Granit</td>
<td>NRPC, NH Granit</td>
</tr>
<tr>
<td>Rivers and Streams</td>
<td>NH Granit</td>
<td>NH Granit</td>
</tr>
<tr>
<td>Parcels</td>
<td>NRPC</td>
<td>NRPC</td>
</tr>
<tr>
<td>Contours</td>
<td>USGS</td>
<td>USGS</td>
</tr>
<tr>
<td>Aerial Imagery</td>
<td>NHDOT</td>
<td>NH Granit</td>
</tr>
<tr>
<td>MapQuest Basemap</td>
<td>MapQuest</td>
<td>MapQuest</td>
</tr>
</tbody>
</table>
4. What staff resources were required to implement the system? (i.e., report approximate staff and consultant time as FTE’s).

The implementation timeline was approximately six months. During this time NRPC devoted .2 FTE (i.e. 1 day/week). Consultant time is estimated to be approximately 40 hours over the time period.

5. Comment on anything unusual about the resources used to develop your system, such as data, software, personnel and financing.

This is a project that illustrates economies of scale through government collaboration. Figuring an even cost-split across 13 communities, the total cost per community is on the order of a few hundred dollars. At this level of investment, NRPC was able to offer MapGeo as a covered service under each community’s Commission membership dues.

<table>
<thead>
<tr>
<th>GIS Datalayer</th>
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<tbody>
<tr>
<td>MapQuest Aerial</td>
<td>MapQuest</td>
<td>MapQuest</td>
</tr>
<tr>
<td>OpenStreetMap Basemap</td>
<td>OpenStreetMap</td>
<td>OpenStreetMap</td>
</tr>
<tr>
<td>Town Boundaries</td>
<td>NH Granit</td>
<td>NH Granit</td>
</tr>
<tr>
<td>Land Use</td>
<td>NRPC</td>
<td>NRPC</td>
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<tr>
<td>Zoning</td>
<td>NRPC</td>
<td>NRPC</td>
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<tr>
<td>Dams</td>
<td>NHDES</td>
<td>NHDES</td>
</tr>
<tr>
<td>Base Flood Elevation</td>
<td>FEMA</td>
<td>NH Granit</td>
</tr>
<tr>
<td>Flood Plains</td>
<td>FEMA</td>
<td>NH Granit</td>
</tr>
<tr>
<td>Subwatersheds</td>
<td>NH Granit</td>
<td>NH Granit</td>
</tr>
<tr>
<td>Watersheds</td>
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<td>NH Granit</td>
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<tr>
<td>Subbasins</td>
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<tr>
<td>Aquifer Transmissivity</td>
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<tr>
<td>Flood Storage Land</td>
<td>NH Granit</td>
<td>NH Granit</td>
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<tr>
<td>Prime Farmland</td>
<td>NH Granit</td>
<td>NH Granit</td>
</tr>
</tbody>
</table>

The system is also integrated with Vision Appraisal, Patriot WebPro, Bing Map Aerials, and Google Street View.