

2003 NASCIO Recognition Awards Application

Innovative Use of Technology Category

**A Partnership to Success:
The Michigan Geographic Framework**

Nomination: The Michigan Geographic Framework

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Category for judging: Innovative Use of Technology

Executive Summary

The Michigan Geographic Framework

Organizations spend billions of dollars producing and using geographic data. Yet, they often still do not have the information they need to solve critical problems. The reasons can range from lack of consistent data, to funding, or jurisdictional control. Often the same information is mapped again and again because little or no coordination exists between organizations.

The Michigan Geographic Framework is an innovative IT project designed to solve data and communication problems by creating and maintaining a seamless, statewide base map for state business needs. Data holdings include statewide school buildings; state owned and leased facilities, state land, state roads and bridges, hydrography, demographics, public drinking water supplies, health incidents, storage tanks, wetlands, soils, wildlife habitat, oil/gas wells, and more.

Michigan has a rich history of data collection. Projects in the 1980s and early 1990s included the Department of Natural Resources' Michigan Resource Information System (MIRIS), the Department of Transportation's base mapping efforts, and the Michigan Information Center's TIGER/Line File improvement projects. While each of these efforts had inherent advantages, significant duplication occurred. And while valuable data was being created, it was inaccessible for broad use in the information community.

The explosion of geographic information system (GIS) technology made it possible to create an environment for stakeholder organizations to work together to integrate and share data within, between, and across organizational boundaries to analyze data to solve problems. Geographic information is not new to the world of government, though. Studies have shown that 80% or more of government information has some geographic component to it - - even as simple as a street address. Furthermore almost all groups involved with public policy have to answer questions about *where, how, why* and *how much will it cost*. It is becoming increasingly clear that by using GIS to answer the *where* questions, decision-makers are more easily able to answer these other key questions.

The State of Michigan has begun to grasp this potential of GIS for influencing public policy. As a result, in 2002 the Michigan Center for Geographic Information (CGI) was established to provide leadership, technical expertise, and policy for the development, use, dissemination, promotion, and sharing of the state's geographic resources. The state created a portal for online GIS data and information administered by CGI: www.michigan.gov/cgi.

The Michigan approach to creating a common geographic framework has resulted in a rich repository of standardized data to more effectively and efficiently serve the citizens, businesses, and other governments of the state. Moreover, the framework enables the knowledge community to create applications that help to better manage resources and effectively deliver services to:

- | | |
|---|--|
| <ul style="list-style-type: none">• Protect children• Improve voter services• Improve transportation, housing, community services, and education• Manage assets and infrastructure | <ul style="list-style-type: none">• Provide for public health and safety, emergency preparedness and response• Manage natural resources and protecting the environment• Enable executive strategic planning and more efficient government operations |
|---|--|

A. Description of project, including length of time in operation.

Background – Geographic Framework Project Development: (1996 – 2000)

The innovative use of Michigan’s digital geographic data is built on a foundation that began in the summer of 1996 when several departments in the State of Michigan voluntarily came together to pool resources and create a single, accurate, statewide Basemap in a GIS called the Michigan Geographic Framework (MGF). Such an undertaking was more than any one department could accomplish alone. But more important, once the framework was built, it would be a knowledge base for all partners to build on, creating applications to help make better decisions, streamline processes, and deliver more effective services. The framework provides a digital knowledge base of natural and built features, as well defined features such as school districts, legislative districts, census areas, and ZIP Code boundaries. In the past, these types of data would have been kept in hardcopy reports or documents, or in “silos” of databases that were difficult to share within or between agencies and departments. The innovation in collecting and maintaining data in a seamless GIS environment, not only makes data easier to access, but easier to keep current. Partners provide map and attribute information via their business applications and they can signal changes that need to be made to the map. The initial departments involved were Management and Budget, Natural Resources, Transportation and the Department of State.

Michigan Geographic Framework Components:	
Transportation	Legislative Districts
Hydrography	Election District Boundaries
Government Boundaries	Points of Interest
Public Land Survey System	Geographic Names
Elevation/Bathymetry	Addresses/ZIP Codes
Census Tabulation Areas	Linear Referencing

The Michigan Geographic Framework Program: (2000 – Present)

Maps quickly become out of date -- roads are built, cities annex property, 9-1-1 systems cause street addresses to change and so on. CGI quickly knew that once the initial geographic framework data was integrated into a single product in 2000, the work just began. The intended end point of the project was to establish an ongoing program that kept the information current and the contributing partners coming back for more. Funding, staffing, standards and IT infrastructure needed to be established to produce new MGF versions on a regular basis. CGI continued to solicit support from other departments by marketing the potential of a geographically integrated approach to data management. After the initial delivery of the MGF, additional state departments began to provide funding to keep the effort going. Currently, seven state departments provide the core funding for and provide input to the program. These departments include Management and Budget, State Police, Family Independence Agency, Transportation, Natural Resources, Agriculture and Environmental Quality. Furthermore, most state agencies are beginning to use the resource for all of their mapping activities. The first version of the Framework was delivered in 2001 with subsequent version deliveries in 2002 and 2003.

The Michigan Geographic Framework Network: (2003 – Present)

The Michigan Geographic Framework Network (MGFN) is a natural extension of the MGF program. While the MGF program looks at the funding, requirements, staffing and IT necessary to keep state departments literally “on the map,” it became clear that the state needed to partner with outside agencies to make sure the information was as accurate, current and timely as possible. Often the best available geographic information is maintained at the local government level. An innovative approach was needed to leverage local data without creating additional bureaucracy or costs to the agencies involved. The CGI has formed the MGFN to “piggy back” on existing local to state geographic information flows but use the MGF as the information delivery vehicle. For example, the network strives to align the geographic data standards and update mechanisms with existing state/federal/local business processes like Road Certification, Governmental Boundary Certification, Census, Voter Registration, etc. In this way, every area of the state will have GIS information stewards and certification experts supplying GIS data and attributes to update the MGF. Local agencies will, in turn, have a GIS base map to support their business applications.

B. Significance to the improvement of the operation of government.

The goal of geographic data integration is not an end to itself. If it doesn’t significantly improve the overall efficiency and performance of government, then it is just a nice map to print and hang on the wall. Four areas of efficiency are considered:

1. Costs – 5 year Cost Benefit Analysis for Data Development and Integration Process:

Direct Cost Savings for State Government -

5 year Cost Benefit Analysis for Data Development and Integration Process:

- 3 Departments were maintaining separate statewide base maps. Over similar timeframe of 5 years the total costs for producing and maintaining each base map is \$ 10 million / map
- 3 Departments x \$10 Million = \$30 Million Expenditure for Non-Coordinated Products

OR

- \$12 Million Investment for Coordinated Product (Cost of Coordination = \$2 Million)

State	\$ 4,300,000
Transportation	\$ 3,000,000
Management and Budget	\$ 1,900,000
Natural Resources	\$ 1,750,000
Community Health	\$ 200,000
Environmental Quality	\$ 500,000
Agriculture	\$ 100,000
State Police	<u>\$ 300,000</u>
	\$12,050,000

SAVINGS

- \$18 Million Statewide Savings (\$30 Million potential- \$12 Million actual)
- \$12 Million /8 Departments = \$1.5 Million (average cost per department)
- Average Department Savings --\$8.5 Million per Department

2. Time Savings

a. “Just in Time” Data delivery mechanism

State and external agencies that use GIS data would often complain that they could never find the information needed for projects. If available, it was often buried inside of departments and division programs without any logical order. In the interest of making framework more readily accessible, CGI has initiated the state web GIS portal for all GIS data, products and related activities. It is found at the following URL: www.michigan.gov/cgi

CGI coordinates all GIS data on behalf of all state agencies including the MGF from this portal. The Web interface provides open access to data, online maps, query tools, tutorials, imagery, and more. The GIS architecture is the cornerstone of a “just in time” data delivery tool - providing the capability to collect, update, and publish the most up-to-date data available so that it is readily available to all. Featured sections include MI Map Gallery, MI Mapper, MI Geographic Data Library, and “Map Michigan” which provides online search options for addresses, route planning, and points of interest.

b. MGF Data Delivers information in time frame that can meet emergency needs

Emergency “high profile” projects, like a homeland security incident, often have incredibly short time frames in which to deliver and use geographic information. The MGF allows the state to provide information that would not be possible before. In the past, decision-makers would not even request GIS data because of the impossible job of pulling together vast amounts of information in a matter of minutes. The time to start thinking about integrating geographic information is not after a homeland security incident. The state is well prepared to handle unforeseen incidents such as this.

3. Degree of Department Transformation

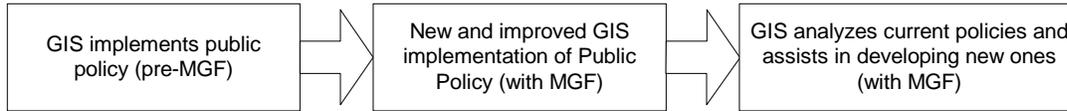
Most of the departments who spent time developing base map data had approximately 7 – 10 staff people performing these map update tasks. Maps were updated to support key department business areas. The work was performed out of necessity, not desire. The incorporation of the MGF project has enabled many staff (approximately 20) to be reassigned to other program areas that use the GIS information. The departments have welcomed the opportunity to focus staff to their core business.

C. Benefits realized by service recipients, taxpayers, agency or state.

The Michigan Geographic Framework is the foundation on which participating agencies can leverage a knowledge base for diverse applications and analysis. Below are some of the diverse examples of how the framework is used for analysis, decision-making, and outreach.

Over the past few years, Michigan government has begun to use GIS to implement public policy. But with the recent advances made with the Geographic Framework Project agencies are looking at new areas to implement more efficient and effective policies. Even more exciting is that the

MGF is allowing government to take this one step further by using GIS as a tool in analyzing current policies and crafting new public policies in response.



The examples below are of programs supported by the MGF that have directly impacted the service recipients.

Education - No Child Left Behind—The Map Michigan effort was immediately available to support the Governors’ new initiative. Each principal of a failing school will receive a “resources profile” generated by the technology behind Map Michigan, to match children and families to needed resources. Profile used to generate improvement strategy.

Operational efficiency: Time savings for integrated information; **Benefits:** School Administrators/Students

Help America Vote Act (HAVA)—Statewide Qualified Voter File; Michigan is a model state for using innovative technology to improve the integrity of the voting system. Project links 83 counties and all jurisdictions greater than 5,000 people to develop a street index file including address information, ward, precinct, jurisdiction, and legislative attributes. The MGF helped produce the initial street index. Subsequent plans are to integrate the MGF into the street index update process.

Operational efficiency: Project not feasible without MGF street data; **Benefits:** All registered voters / clerks

Census Improvement—A GIS-based process achieved an unprecedented 90%+ participation rate from Michigan communities to update TIGER/Line files for the 2000 Census. Initiative linked to the Qualified Voter File.

Operational efficiency: No other state achieved more than 20% participation; **Benefits:** State/Local Governments

Statewide Land Database—Department of Management and Budget, Department of Natural Resources, and Department of Transportation effort to establish a comprehensive inventory of the states real estate infrastructure. Michigan is now well positioned with data and tools to more easily comply with the new GASB34 accounting rules. The land data is also used for analysis in smart growth initiative.

Operational efficiency: Governor can set holistic land use policies - reducing waste **Benefits:** Tax payers

Emergency Response—State Police Emergency Operations Center analyzes events on a statewide basis resulting in effective allocations of resources and improved public safety. Also working with State Police 9-1-1 operations to provide map base products for the emergency dispatch process.

Operational efficiency: Current GIS makes for effective and timely response **Benefits:** Service recipients

Health—Department of Community Health leveraging data to map consecutive year birth, death, and cancer records statewide. The Geographic Framework data will also support new efforts to establish an electronic disease surveillance system to track West Nile Virus and threats of bioterrorism.

Operational efficiency: Produced better research results with better geocodes **Benefits:** Healthcare recipients

Family Independence Agency Customer Service—Using the Web, GIS, and Michigan Geographic Framework has allowed FIA to get innovative tools to mine data and visually overlay information by county office, empowering caseworkers and using maps to move children to foster care homes in their same school district.

Operational efficiency: More effective customer service **Benefits:** FIA Customers

Environmental Resource Mapping—Wetland, soils, forest cover, wildlife habitats, and more are mapped and managed. Aboveground and underground storage tank locations are being monitored statewide.

Operational efficiency: Ecosystem management approach is now possible **Benefits:** Natural resources

Economic Development—Abandoned properties analyzed for demolition, clean up, and redevelopment.

Operational efficiency: Replaces inefficient tax-reversion process **Benefits:** Neighborhoods and businesses

Michigan School Info Online—Online search tools for information about any school in the state, view school report cards, and community information. Search and compare schools, or choose geographic region and view all schools in that region. A service for citizens to make informed decisions.

Operational efficiency: Parents have more info to select schools of choice **Benefits:** Parents

Road Funding Process (Act 51)--- The distribution of over 1 billion in road funds to counties and incorporated places in Michigan has been re-engineered from approximately 10,000 hard copy maps to the MGF base. Internet communication process is in planning stages. Error-filled maps made for unfair distribution of funds.

Operational efficiency: Communities update one base map; map doesn't allow cheating **Benefits:** Communities

D. Return on investment

The cost efficiencies and the direct benefits described in sections B and C above are also to be considered a ROI. Here is a review of the major cost savings.

Direct Cost Savings for State Government -

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In addition to these, the most important return on investment from this project is the political return. The MGF has brought together state departments and key elected officials from all levels of government in the state. Key issues facing the state such as homeland security, smart growth initiatives, and education do not respect government jurisdiction. Neither should the data. The MGF has given these leaders a literal “cross-roads” of information that allows all to come together on the map. Maps allow us to visualize the situation much more effectively than statistics or reports can do alone. Public policymakers and leaders need the best information available to them from the point of policy creation to implementation. In Michigan, the MGF has become a literal geographic information magnet to facilitate this process.