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# The Ohio GIS Network: Stage 1 1993 Investment Fund Development Grant Progress Report to the Ohio Board of Regents (Ohio GIS Network)

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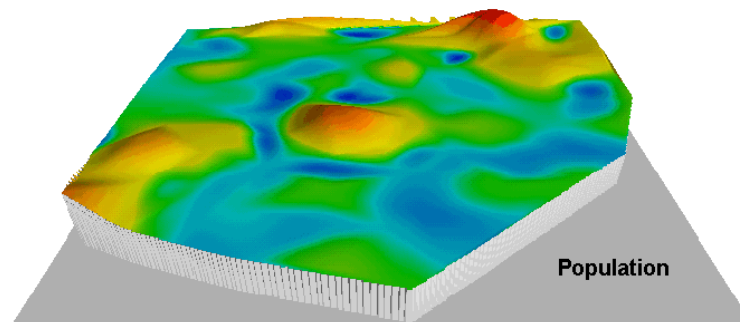
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**The Ohio GIS Network: Stage 1  
1993 Investment Fund Development Grant  
Progress Report**

to

**The Ohio Board of Regents**



**Ohio GIS Network is a collaboration of**

**The Urban University Program  
and  
The Rural University Program**

**Stage 1 Participants include  
Cleveland State University  
Ohio University  
University of Akron  
Wright State University  
Youngstown State University**

September 12, 1997  
**The Ohio GIS Network**

# 1993 Investment Fund Development Grant Progress Report

September 8, 1997

## PROJECT DESCRIPTION

The Ohio Geographic Information Systems Network (Ohio GIS-Net) is an innovative consortium of Ohio's urban and rural universities. The consortium is building a center of excellence where state-of-the-art geographic information systems (GIS) technology is applied to a research agenda that is critical to Ohio's economic development and central to research issues in policy sciences, civil engineering, public administration, economics and the environmental, urban and regional sciences. This cutting edge technology is an essential component of the basic research infrastructure of universities. It is also a critical resource in state and local economic development efforts, building and maintaining public infrastructure, and in addressing environmental issues. Ohio GIS-Net seeks to focus research and technical assistance resources in the university consortium on the cross-cutting issues of economic and regional development, infrastructure investment, and environmental management.

In 1993, five members of the consortium received a \$100,000 Investment Fund development grant from the Ohio Board of Regents (OBOR). This grant was used to initiate Stage 1 of the development of the network. The five universities included Cleveland State University, Ohio University, University of Akron, Wright State University, and Youngstown State University. Additional universities were funded by the 1996 Investment Fund grant from OBOR, initiating Stage 2 of the project.

In the first stage the five universities made the Ohio GIS-Net a reality by leveraging the grant into an investment of over \$357,000. These investments have been highly successful in achieving targeted levels of capital investment in GIS equipment through the OBOR planning grant and, with leveraged funds, in investments in software, establishing standards, professional training, database development, and providing the foundation for a substantive research agenda and attracting non-state research grants. These accomplishments laid the ground work for further success in implementing the Ohio GIS Network.

Thus, the \$100,000 development grant was highly successful in: 1) leveraging another \$257,000 in infrastructure and supporting investments by the universities; 2) raising the level of capability among the five universities to conduct GIS-based research projects; 3) enabling and encouraging several collaborative research projects; and 4) and building the foundation that led to an award of an \$860,000 Investment Fund grant in 1996 to expand the Network.

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<sup>1</sup> GIS is an information management system that collects, stores, retrieves, analyzes, and displays spatially-related information. It permits analysis of geographically related data, the application of these data to analytical models, and the interactive display of data output in maps, graphs and tables. GIS technology is a powerful tool for technical and applied research and can be an important aid in decision-making in both the public and private sectors.

This progress report focuses on the activities and achievements related to the 1993 Investment Fund development grant. A separate report is provided for the 1996 grant.

## **QUALITY OF RESEARCH AND EDUCATION**

As the only state-wide, multi-university research and technical assistance GIS network in the nation the consortium represents a critical mass of pooled expertise in both the development and operation of GIS systems and faculty and staff pursuing related research agendas. Ohio GIS-Net serves as a laboratory for university research and the use of integrated sets of spatially-referenced databases. It enhances research capabilities of member universities and promotes resource sharing and technology transfer.

### **Research**

The existence of the network has, and increasingly will, attract university-based researchers and facilitate national competitiveness in research funding. Even as the GIS-Net was in the initial stage of implementation, the networked technology proved to be a support tool for decisions related to state economic development. The Ohio network assisted the Ohio Board of Regents with its strategic planning process by providing demographic data, maps, and analysis on the potential college bound population. Another early achievement of the consortium was the collaboration to assist the Ohio Department of Development assess funding allocation formulas. Researchers and technical staff collaborated in database design and development, mapping design, sharing data, and analysis.

Greater synergy is achieved by GIS-Net's role as a networked data management and analysis laboratory for two other university-based statewide networks, the Ohio Economic Development Information Network (OEDIN) and the Ohio Housing Research Network (OHRN). These two groups of more than 20 researchers representing eight universities work primarily with specialized, geographically detailed databases. These common databases permit comparative regional analysis that address national, as well as statewide, issues of concern and GIS can improve the analysis and decision-making. By serving as the technology and data platform for these collaborations, the GIS network magnifies the potential for national excellence and leverage of non-state research funds.

Appendix A lists examples of research facilitated by the Investment Fund grant.

### **Education**

Many graduate and undergraduate students have benefited from the GIS-Net facilities through involvement with both research and technical assistance projects. Nearly every project has included one or more students. The research methods are given life when students apply them on actual research problems addressed with the GIS technology made available with the

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<sup>2</sup> One of the OHRN researchers has recently been credited with shaping national policy through the capital gains tax which affects urban development. See Appendix B.

Investment Fund grant. It is particularly beneficial for students to gain experience and expertise in solving practical problems dealing with public service activities undertaken with the GIS facilities. Indeed, there is strong consensus among the educators using these facilities that these students are the first to find employment upon graduation.

Appendix A provides some measures of how student training and research has been facilitated by the Investment Fund grant.

## **COLLABORATIONS AND ECONOMIC DEVELOPMENT IMPACT**

Each university brings to the consortium a variety of complementary technical and substantive areas of expertise; some have stronger GIS instructional curricula and theoreticians, others offer strong professional academic programs and public service outreach programs, some focus on urban development issues and others on rural development, and all have institutionalized applied research and public service outreach functions. Ohio GIS-Net enhances the research capabilities and sharing of resources and methods for existing multi-disciplinary research networks concerned with public policy issues.

Furthermore, these resources are made available in local and regional settings, offering effective tools for policy development across the State. This university GIS network, working in each of the State's regions, provides the mechanism for regional dialogue, cooperation, and decision making, as well as serve as local information access points to comprehensive statewide and local training, technical service, and applied research. A concentrated, applied research agenda in Ohio creates both practical outcomes for the state and establishes the State as a research laboratory and national leader in research excellence.

Appendix A lists examples of public service and technical assistance projects that assist in local and statewide economic development, which have been provided by Ohio GIS-Net.

### **Economic Development**

Ohio GIS-Net responds to a critical state need in economic development and infrastructure development. More rational and effective statewide and local public policy decisions regarding economic development can be proposed, tested, and evaluated through collaborative, comparative, and focused analyses. These analyses come from several fields of research, including: economic geography, regional economics, regional science, urban studies, environmental science, public management and administration, civil engineering, policy sciences and others. Appendix A includes examples of research, public service ,and technical assistance activities that have assisted local and statewide economic development.

### **Expenditures and Leveraging**

A budget table for Stage 1 implementation of Ohio GIS-Net is attached in Appendix C. Including the \$100,000 Investment Fund development grant, a total of more than \$357,000 in capital equipment and related support have been invested. The equipment includes

state-of-the-art workstations and data storage and input and output devices which are required for large spatial database development, management, and analysis. The network shares devices as needed.

Each participating university supports GIS-Net in the form of operational costs, including: software licensing<sup>3</sup>; training; maintenance; supplies; technical support staff; and other operational costs. Support staff include data managers, programmers, system analysts, GIS specialists, and graduate students. Sources of the matching funds include the Ohio Board of Regent's Urban University Program (UUP) and Rural University Program (RUP). University funding of some graduate assistants and faculty supervisors also supports the operations of the facilities.

In addition to this support the consortium receives grants and contracts for research and technical assistance from federal, state, and local sources. For grants the (minimum estimate) leverage ratio is 5-to-1 for the Investment Fund development grant. Additional leveraging is found in the technical assistance contracts. Some examples of grants and contracts are provided in Appendix A.

## **PROCESS FEEDBACK**

The objective of the 1993 Investment Fund development grant to Ohio GIS-Net was to provide an incentive to further develop a strong GIS-based research capability at Ohio universities. As a result of the grant the Stage 1 Ohio GIS-Net consortium was able to achieve the following: 1) leverage another \$257,000 in infrastructure and supporting investments by the universities; 2) raise the level of capability among the five universities to conduct GIS-based research projects; 3) initiate and undertake several collaborative research projects; and 4) build the foundation that led to an award of an \$860,000 Investment Fund grant in 1996 to expand the Network.

Thus, the 1993 Investment Fund development grant accomplished its objective. The consortium used the grant to immediately leverage additional investments. It then set out to build the Network further through achieving some early successes and building linkages with other universities with strong GIS and research capabilities. With this groundwork laid, the Network was able to win a larger Investment Fund grant to significantly expand the Network to the other universities. The nine-university Ohio GIS Network is now developing a strong research agenda that will contribute to proving that the Investment Fund program is a benefit to the State.

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<sup>3</sup> Based on the leadership of the consortium in responding to GIS training, research and public policy decision support needs within the state, the Environmental Systems Research Institute, vendor of the primary GIS software, has committed to providing a statewide University Site License agreement at a significant discount. This agreement will be administered by the Ohio Library Information Network (OhioLink), which is a statewide consortium of colleges and universities sharing library resources. The software licensing agreement will provide greater and more affordable access to GIS software for all the institutions of higher learning in the State.

## APPENDIX A

### **Ohio GIS-Net** **Research and Public Service Activities** **Benefiting from 1993 Investment Fund Development Grant** (Selected List)

#### **I. RESEARCH AND EDUCATION**

##### **Publications**

- "Toward Environmental Justice: Spatial Equity in Ohio and Cleveland", William Bowen, Mark Salling, Kingsley Haynes, and Ellen Cyran. Annals of the Association of American Geographers, Vol. 85, No. 4, 1995, pp. 641-663.
- "Using GIS to Make Parcel-Based Real Estate Decisions for Local Government: A Financial and Environmental Analysis of Residential Lot Redevelopment in a Cleveland Neighborhood", Robert Simons and Mark Salling. URISA Journal, Vol. 7, No. 1 (Spring), 1995, pp. 7- 19.
- "The Effect of Underground Storage Tanks on Residential Property Values in Cuyahoga County, Ohio". R. Simons. Journal of Real Estate Research., 1995.
- "The Effect of Spatial Autocorrelation on Hedonic Modeling of Property Values", R. Simons, W. Bowen.
- "Urban Property Values, Percolation Theory and Fractal Geometry", Fractals, September, 1994.
- Planning Support Systems: A New Perspective on Computer-aided Planning. Richard E. Klosterman. Journal of Planning Education and Research In press.
- Loosely-coupled Modeling with GIS and a Spreadsheet. Richard E. Klosterman and Yichun Xie. International Planning Journal. In press.
- The Appropriateness of Geographic Information Systems for Regional Planning in the Developing World. Richard E. Klosterman. Computers, Environment and Urban Systems 19, 1 (1995): 1-13.
- Comment: Planning Support System and the New Logic of Computation. Richard E. Klosterman. Regional Development Dialogue 16, 1 (1995): 18-19.
- Loosely Coupled Modeling with GIS and an Electronic Spreadsheet. Richard E. Klosterman, In Toshiro Edamura, ed. Proceedings: International Workshop on the

Application of Coms in Urban Planning. Kobe, Japan: Information Processing Center, Kobe, Japan, 1995.

- Editorial: International Support for Computers in Planning. Richard E. Klosterman. Environment and Planning B: Planning and Design. 21 (1994): 387-392.
- Guest Editor. Large-Scale Urban Models: Retrospect and Prospect. Richard E. Klosterman. Journal of the American Planning Association. 60 (1994): 3-44.
- Introduction, Large-Scale Urban Models: Retrospect and Prospect. Richard E. Klosterman. Journal of the American Planning Association. 60 (1994): 3-6.
- An Introduction to the Literature on Large-Scale Models. Richard E. Klosterman. Journal of the American Planning Association 60 (1994): 41-44.

### **Papers Presented**

- “Development of an Implementation Plan for Sharing Geographic Information in Greater Cleveland.” Mark Salling. Presented to the Applied Geography Conference, Akron, Ohio. October 14, 1994.
- “Using GIS to Make Micro-Level Real Estate Decisions: A Financial and Environmental Analysis of Residential Lot Redevelopment in a Cleveland Neighborhood.” Mark Salling and Robert Simons, presented at the annual conference of the Urban and Regional Information Systems Association, Milwaukee, WI. August 11, 1994.
- “Predicting the Course of Change in Property Values.” Robert Simons and Mark Salling, presented at the Urban Affairs Association, May, 1995.
- “A Collaborative Planning Support System.” Richard E. Klosterman. Presented to the 38th Annual Conference of the Association of Collegiate Schools of Planning. Toronto, Ontario, July 1996.
- “Loosely Coupled Modeling with GIS.” Richard E. Klosterman. Presented to the International Workshop on Applications of Computers in Urban Planning. Kobe, Japan, November 1995.
- “From GIS to Planning Support Systems.” Richard E. Klosterman. Presented to the Kansai Branch of the Japanese Association of Planners. Osaka, Japan, November 1995.
- “A Planning Support System for Teaching Land Use Planning.” Richard E. Klosterman. Presented at the 37th Annual Conference of the Association of Collegiate Schools of Planning. Detroit, Michigan. October 1995.



- “Workshop: GIS Resources for Planning.” Richard E. Klosterman. 1995 Annual Conference of the Ohio Planning Conference, American Planning Association. Akron, Ohio, October 1995.
- “Keynote Address. Richard E. Klosterman. Fourth International on Computers in Urban Planning and Urban Management.” Melbourne Australia. July 1995.
- “Planning Support Systems: A New Approach to Regional Analysis and Planning. Richard E. Klosterman.” Presented to the Regional Research Institute, West Virginia University. Morgantown, WV, March 1995.
- “Planning Support Systems: A New Perspective on Computer-aided Planning.” Richard E. Klosterman. Presented to the 36th Annual Conference of the Association of Collegiate Schools of Planning. Tempe, AZ, November 1994.
- “Information Needs in an Era of Financial Constraints.” Richard E. Klosterman. Presented to the 16th Annual Applied Geography Conference. Akron, OH. October 1994.
- “Planning Support Systems.” Richard E. Klosterman. Presented to the 32nd Annual Conference of the Urban and Regional Information Systems Association. Milwaukee, WI. July 1994.

## **Grants**

- Community Development Block Grant Allocation Formula Analysis. \$25,000 grant from the Ohio Department of Development, Office of Community Services to OU and CSU.
- Development of Training Curriculum for Ohio's GIS Practitioners. \$36,000 grant from the Ohio Geographically Referenced Information Program and the Ohio Urban University Program to CSU and UC.
- Dayton Economic Development - Linking of GIS and the Internet to provide the City of Dayton, companies and developers with data and information that will impact the decision to locate or expand in the Dayton area. This project is a partnership between City of Dayton Economic Development, Ohio Department of Development and WSU.
- Election Precinct Mapping - Preparing for Redistricting in 2000. Funded by Ohio Legislative Services Commission. \$488,000 grant to CSU and OU.

## **Education**

### Theses and Exit Projects

"Urban Property Values, Percolation Theory and Fractal Geometry", Masters Thesis, Cleveland State University, June, 1994.

"Liquor Stores and Outlets and the Distribution of African Americans", Masters Exit Project, Cleveland State University, June, 1997.

Number of students working on GIS-facilitated research/TA projects: approximately 100.

Number of courses using GIS resources: approximately 25/year.

## **II. Public Service and Technical Assistance**

### **A. State-wide Public Service**

- Demographic Analyses Reports for the Ohio Board of Regents. Collaboration among all GIS-Net members.
- Community Development Block Grant Allocation Formula Analysis for the Ohio Department of Development, Office of Community Services. Collaboration among two GIS- Net members.
- Development of Training Curriculum for Ohio's GIS Practitioners. Collaboration among two GIS-Net members.
- Preparing Ohio for Elections in the 21st Century: Phase 1. Collaboration between two GIS- Net Members.

### **B. Regional/Local Technical Assistance**

- Development of GIS for the City of Stow.
- Development of GIS for the City of Barberton.
- Development of GIS for the City of Aurora.
- Development of GIS for St. Clair-Superior Community Organization
- GIS training for the City of Euclid.
- Tremont Neighborhood Redevelopment Analysis (City of Cleveland - Community Development Department)
- Cleveland Area Regional Environmental Planning In Action Network (CAREPLAN), an AmeriCORPS Environmental Service Learning Project.
- GIS/Mapping for Mill Creek regional sewer development project.

- GIS for Wellston, Ohio.
- Neighborhood Development Corp (NDC) - Mapping to geographically locate property owned by NDC's and FCDC's, Dayton area.
- Wellfield Protection Program - Created maps indicating jurisdiction and protection area boundaries.
- Greater Dayton Area Hospital Association - Mapped survey results and located respondents to closest street intersection to aide in analysis.
- Affordable Housing - Analysis of the factors that effect the location of housing vs. the location of individuals capable of affording the housing in the Dayton area.
- Dayton Economic Development - Linking of GIS and the Internet to provide the City of Dayton, companies and developers with data and information that will impact the decision to locate or expand in the Dayton area. This project is a partnership between City of Dayton Economic Development, Ohio Department of Development and CUPA at WSU.
- Columbiana County Land Use Plan
- Western Reserve Care System/Mahoning County Health Department Childhood Lead Poisoning Study
- Youngstown-Mahoning County Bicentennial Mahoning River Neighborhood Redevelopment Study
- Mahoning County Board of Elections Youngstown Ward Redistricting Project
- 7th District Ohio Court of Appeals Demographic and Case Load Analysis
- Mill Creek Metropolitan Park District Economic Impact Study
- St. Elizabeth Hospital Medical Center (Youngstown) Low Birth Weight Study
- YSU Center for Engineering Research and Technology Transfer Cambell Works Brownfield Redevelopment Project
- many miscellaneous mapping projects.

## APPENDIX B

‘Tax Law Could be a Boon for City Neighborhoods’  
by Neal R Peirce, syndicated columnist for the Washington Post Group  
article appeared in (Cleveland) *Plain Dealer*, Monday August 11, 1997

## APPENDIX C

### OHIO GIS-NET Stage 1 Implementation

Item		CSU	OU	UA	WSU	YSU	Total
HARDWARE	Workstation Platform	SUN SPARC 20 612SX	a) DEC Apha AXP600 b) DEC Apha AXP300X	SUN SPARC 20	SUN SPARC 10 51 +file serv. opt.	SUN SPARC 10	
	Memory	192MB	a)128MB, b)32MB	64 MB	96MB	128MB	
	Disk	10GB	4GB	8GB	3GB	5GB	
	CD-ROM	YES	YES	YES	YES	YES	
	Tape back-up	YES	YES	YES	YES	YES	
	Power Supply	YES	existing	YES	YES	existing	
	Monitor	20" color	2 19" color	17" color	16" color	color	
	X-terminals or PCs	3 X-term, 2 PCs	A few existing PCs	2 PCs	5 X-terminals	existing PCs	
	Printers/ Plotters	2 + existing	1 + existing	2	existing	existing	
Cables, networking	YES	existing	YES	YES	YES		
SOFTWARE	ArcInfo	6 users	3 users	3 users	6 users	3 user	
	SAS	5 users	5 users	existing PC/mainframe	5 users		
	Database (GIS)	NO	NO	dBase for existing PC	Informix		
	Other Utilities	geocoder, C++, other graphics util.	NO	AutoCAD, ARC/Cad, dBase, PC X-term emul.	Printer network utility		
TRAINING	ArcInfo/SAS (\$ allocated)	\$10,000	\$2,500	\$3,000	\$2,500	Trained 3 persons. (Not included in budget.)	
SUPPLIES, FURNITURE, MISC.		\$3,000	\$5,500	\$2,500	\$0	\$0	
OTHER		existing digitizer available	existing 5 PC ArcInfo & other resources available	space renovations \$11,000 match		extensive existing resources available	
TOTAL BUDGET	(Not incl. existing.)	\$115,660	\$51,514	\$32,626	\$52,837	\$65,323	\$317,960
	OBOR:	\$35,307	\$15,754	\$16,313	\$16,313	\$16,313	\$100,000
	UUP/RUP:	\$35,307	\$15,754	\$16,313	\$16,313	\$16,313	\$100,000
	University/Other:	\$45,046	\$20,006	\$39,074	\$20,211	\$32,697	\$117,960

