Sharing Spatial Data In Michigan

The First Step in Building Geographic Information Systems

by ***Joe VanderMeulen,*** *Director*
Science & Technology Division, Legislative Service Bureau, Lansing

About one year ago, the Department of Natural Resources, the Library of Michigan, the Legislative Service Bureau, and Michigan State University announced the formation of a new digital data sharing network. This new network was an outgrowth of a project funded by the W.K. Kellogg Foundation called *Improving Michigan's Access to Geographic Information Networks* (*IMAGIN*). Focusing on geographic data and geographic information systems (GIS), these four public agencies developed a simple agreement to share digital data with each other and offered the same agreement to others. Within a few months, the IMAGIN Data Sharing Network (IDSN) admitted a dozen new members and appointed a Board of Directors. Today, there are over 35 participating public organizations with several new groups joining each month.

To some observers, this sudden growth of a GIS data sharing network is astonishing. Why do public organizations need an agreement to share data that is already public? What makes GIS data any different from paper documents or other forms of digital data? How can public organizations benefit from joining the IDSN?

Background

Computers, video displays, and digital data have become part of our professional lives. Letters, memos, and reports are no longer just paper documents. Most written words in professional offices now exist both on paper and as computer-readable digital data. Accounting ledgers are provided on large format paper and as digital spreadsheets, and transmitted on magnetic media such as floppy disks or across electronic networks. Most property assessments are found in big binders at the assessor's office and in digital databases. Within the last decade, all forms of engineering plans and mapped information have been moved into the digital realm as well.

Planning and zoning officials have long recognized the benefits of using computers and digital data as mechanisms for collecting, storing, analyzing, processing, displaying, and reporting information. With the development of GIS, governmental units at all levels have begun converting their paper maps and associated records into digital maps and databases. However, the process can be both difficult and expensive, raising a number of concerns over the ultimate value of digital maps.

ABOUT THE AUTHOR

Mr. VanderMeulen is the director of the Science and Technology Division of the Michigan Legislative Service Bureau. The Science and Technology Division is charged with providing all legislators objective science and technology information, research and analysis. ❑

By most accounts, GIS data is much more expensive, complex, and useful than most other forms of data collected by governmental units.

By most accounts, GIS data is much more expensive, complex, *and useful* than most other forms of data collected by governmental units. Like paper maps, digital maps depict geographic information within coordinate space. That is, points, lines, and areas are represented at the latitude and longitude that they would actually be found on the earth, within some margin of error. Unlike paper maps, the coordinates represented in digital maps can be electronically linked to digital databases of information about the objects or locations depicted. For example, if the coordinates of drinking water wells are entered (digitized) into a GIS, their locations can be linked to a digital database of well drilling records. The GIS operator can then represent the geological information spatially. For instance, a map of relative clay thickness within the first 50 feet could be generated by relatively simple queries for display on a computer screen or printing on a plotter or laser printer.

To build a successful GIS, organizations need multiple layers of digital data that are compatible with each other and the GIS software in use.

The current and potential applications of GIS data and technology appear almost limitless. GIS has helped local governments in Michigan analyze and display census data, parcel assessment information, and school district lines. Cities and villages have used GIS to plan and manage public utilities, transportation networks, and the protection of sensitive environmental areas [see December 1992, **PZN**]. However, this dramatic proliferation of GIS use and the growing demand for more data has raised a number of new questions regarding public information management.

IDSN MEMBERS

Federal Agencies
- USDA/Forest Service
- USDA/Soil Conservation Service
- US EPA/Grosse Ile
- USF&W/Seney Nat'l Wildlife Refuge
- USGS/Michigan District

Universities
- Eastern Michigan University
- Lake Superior State University
- Michigan State University
- Michigan Technological University

State Agencies
- Legislative Service Bureau
- Library of Michigan
- MDA
- MDNR
- MSHDA

Multi-County Agencies
- CUPPAD Regional Commission
- District Health Department #1
- District Health Department #5
- GLS Region V PDC
- NWMCOG
- SW Michigan Commission
- West MI Shoreline RDC

County Agencies
- Bay County
- Benzie County
- Berrien Co. Health Department
- Kalamazoo Co. Road Commission
- Leelanau County
- Livingston County
- County of Manistee
- Mason Co. Drain Commission
- Montmorency County
- County of Oceana
- Presque Isle County
- Roscommon Co. Road Commission
- Van Buren County
- Wexford County

Local Agencies
- Bruce Township (Chippewa)
- Garfield Township (Grand Traverse)

Non-Profit Corporations
- Michigan Society of Planning Officials
- Northwest MI RC&D Council

Digital Data and GIS

To build a successful GIS, organizations need multiple layers of digital data that are compatible with each other and the GIS software in use. Layers of geographic information digitized at different scales will have different relative accuracies, limiting their compatibility. For example, roads and bridges digitized at one scale may not properly overlay rivers digitized at a different scale.

Similarly, organizations need authoritative, verifiable information. For example, the best source for soil type information is probably the U.S. Department of Agriculture's Soil Conservation Service. The most up-to-date and accurate source for parcel information is probably the county equalization directors and local assessors. Therefore, most GIS users want to obtain specific digital files from the program office or regulatory authority responsible for that layer of information.

In many cases, geographic information changes. For example, sites of environmental contamination are identified under the Environmental Response Act (1982 PA 307) in an annual list. The DNR's Environmental Response Division and Michigan Resource Information System (MIRIS) is developing a GIS map file of these sites which will change each year. Municipal and township zoning maps will also change at regular intervals. Consequently, GIS operators need a network of contacts to keep their data files up-to-date.

A similar updating problem occurs when a GIS operator or client finds errors or changes in the conditions mapped. If the file is developed and maintained by another person or agency, some standard contact needs to be established.

The Federal Geographic Data Committee (FGDC) has begun to respond to these issues on a national level. Last year, the FGDC finalized a standard to support the exchange of digital spatial data across different computer platforms and software. This year, the FGDC issued a standard requiring all federal agencies to maintain specific information on each spatial data file, including: the original map scale, the map coverage, the positional accuracy of elements on the map, and the source and date of information used to create the map. This information about data files, referred to as *metadata*, is almost always lacking in GISs now in use across the state. However, without the metadata, users can never be sure of the integrity of the map file.

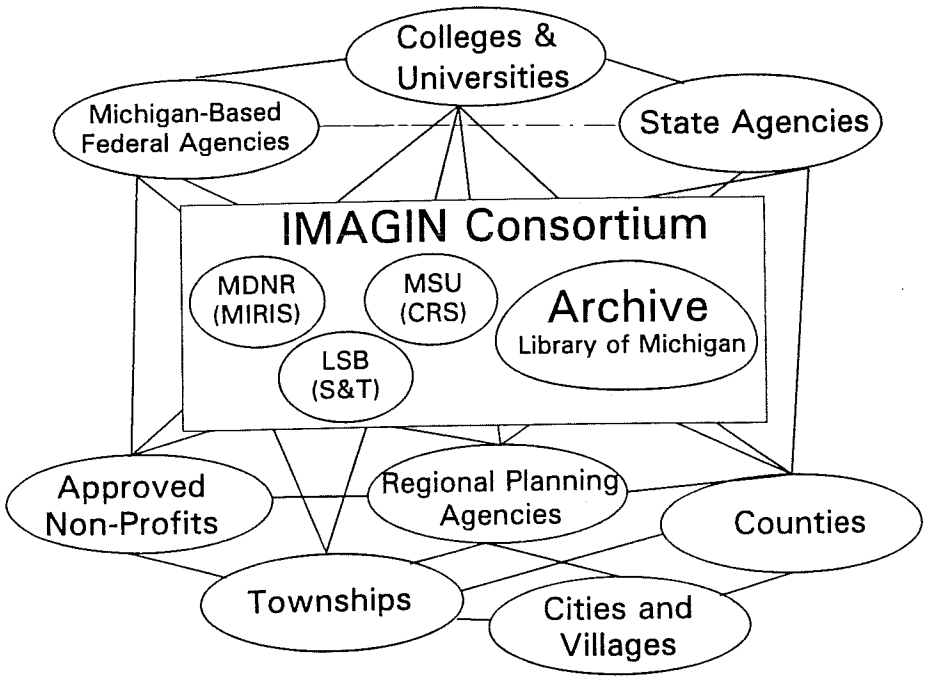
The IMAGIN Data Sharing Network

Sooner or later, all public organizations that use GIS will have to address the complications and issues noted above. Some groups will have trouble using or adhering to the federal spatial data standards. Other local organizations will have trouble identifying and obtaining useful data files being created by the DNR or other state agencies. In some cases, local governments will need assistance in developing a new digital file in cooperation with adjacent local governments.

The IMAGIN Data Sharing Network (IDSN) was created to help public organizations and other GIS users address these and other issues encountered in dealing with spatial data. The IDSN provides its members a well-defined network of like-minded organizations involved in GIS. Members of the IDSN elect a Board of Directors, form standard-setting and technical advisory committees, contribute to a bimonthly newsletter, participate in a statewide digital data archive, assist each other with questions and technical problems through personal and electronic mail contacts, and exchange well-documented digital data files.

Under the existing IDSN Bylaws, public organizations can join the IDSN by signing a legally binding agreement to share digital data with other members and abide by the Bylaws. This relatively short document calls on members to exchange data and adhere to several basic principles, including:

- members submit nonprivileged digital data to the Archive;
- members share nonprivileged digital data with all other members;
- members retain *ownership* of their digital data;
- members will inform data owners of errors found in their data;
- data owners are responsible for changes, corrections, and updates;
- requests for data from non-members are directed to the data owner;
- members may use shared data to support their normal functions;
- members will properly cite or credit data sources;
- members will not misrepresent or misuse data; and
- members will provide proper data documentation.



Source: Legislative Service Bureau.

Under the existing IDSN Bylaws, public organizations can join the IDSN by signing a legally binding agreement to share digital data with other members and abide by the Bylaws.

As shown in the sidebar, the current membership of the IDSN is quite diverse. Membership is open to all public organizations and non-profit organizations approved by the Board of Directors, including: colleges and universities; municipal, township, and county governments; public health agencies; planning agencies; Michigan-specific branches of federal agencies; state agencies; and approved non-profit organizations. In every case, these organiza-

tions respect each other's authority and responsibilities over specific GIS data sets.

IDSN Member Benefits

By joining the IDSN, members gain access to a community of GIS users and information technology managers. Members are encouraged to help each other and share the knowledge gained from experience in this fast changing field. There are also a number of more tangible benefits to IDSN membership.

Access to Authoritative Digital Data. Each member organization is invited to exchange digital data with every other member. For many members, access to the many critical layers of data within DNR's MIRIS is particularly valuable. Other data sets include TIGER and census files, state and federal political district lines, school district lines, oil and gas well locations, and many local parcel, zoning, and natural features maps.

The IDSN has already adopted Recommended Minimum Standards for Parcel Mapping.

Digital Data Archive and Map Access Center. The Library of Michigan is providing data archive services for IDSN, assuring safe, long-term storage of the digital files submitted by the members. In the future, the IDSN Archive will be on-line for electronic access by members via the Internet. In addition, the Library showcases maps submitted by members in a public viewing station called the Map Access Center. Three additional Map Access Centers are being constructed for demonstration purposes at public libraries located in Grand Rapids, Flint, and Detroit.

Free Metadata Management Software. Based on funds provided by the W.K. Kellogg Foundation, the IDSN has developed a unique computer program for developing and maintaining information on each map file. *DataLogr* provides an easy, menu-driven program for establishing data documentation, including the documentation required under the federal Metadata Standard promulgated by the FGDC.

Participation In GIS Standards Committees. As a statewide membership organization, the IDSN has begun developing recommended standards for use in developing and maintaining spatial data in Michigan. These standards are being adopted by member organizations as needed to help guide GIS managers throughout the state. The IDSN has already adopted *Recommended Minimum Standards for Parcel Mapping.*

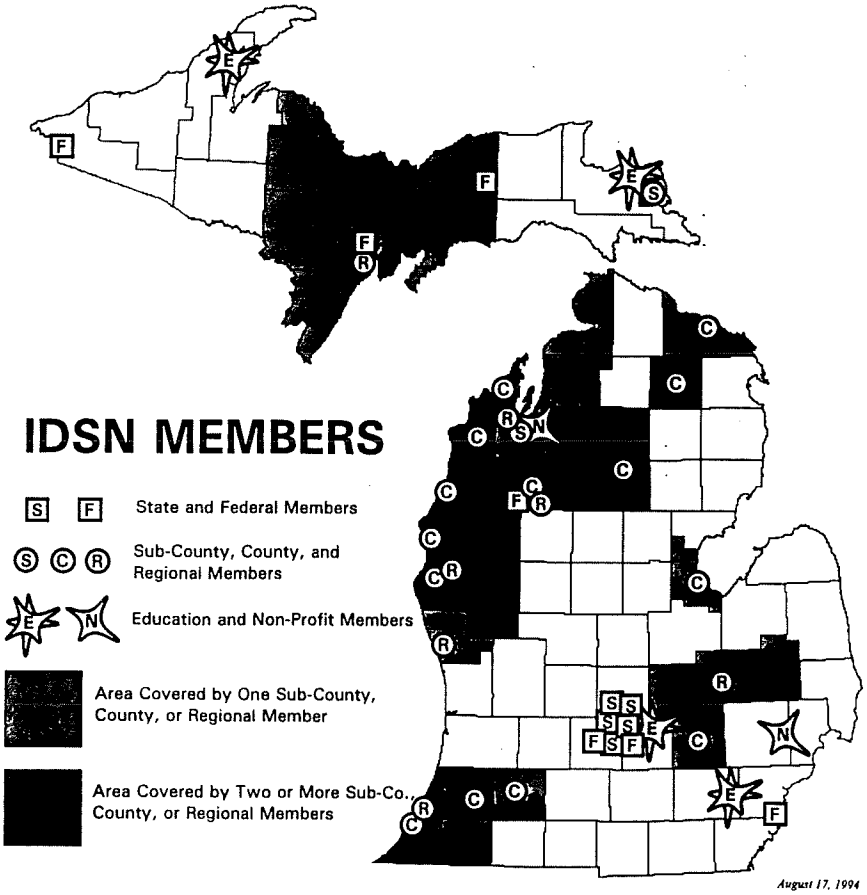
IDSN Newsletter. Each member of the IDSN receives the IDSN Newsletter, a bimonthly publication with features and information on the creation, maintenance, access to, and archiving of GIS and related digital data files. Regular features include an introduction of new members and the data they bring to the network, news from recent Board and committee meetings, the latest news from the archive, notes and trends reported in the GIS literature, tips and tricks for working with GIS and related software packages, a listing of upcoming events, and feature stories from and about IDSN members and activities.

Annual IMAGIN Forum. The Annual IMAGIN Forum has become the premier statewide GIS conference over the last three years. The fourth Annual IMAGIN Forum has been scheduled for April 10 and 11, 1995, at The Lansing Center. This conference will provide plenary sessions with presentations by nationally recognized experts from the GIS industry, representatives from the FGDC, and other state GIS programs. The Forum also features a series of break-out sessions presenting case-study and technical assistance information and vendor displays. All IDSN member organizations will be granted reduced registration fees for this important event.

A Future of Growth and Participation

On August 15th, the IDSN Board of Directors held its quarterly meeting. The Board admitted several new members, heard reports from its standard-setting task groups, and considered proposals for changes in the IDSN Bylaws. At that meeting, the Board agreed to ask the membership for a substantial change in the Bylaws. If approved by a majority of members in the September election cycle, the IDSN will establish a new category of membership. To expand and improve the exchange of ideas and technical knowledge, the IDSN would provide a *General Member* category for those who do not wish to share data. This category will allow businesses and individuals to join the network and participate in task groups, meetings, and gain access to the catalog of data documentation and IDSN members maintained by the IDSN archive.

Based on the rapid growth and expanding interest in the IDSN, it is clear that this new network has begun to fill an important role for the GIS community in Michigan. By remaining flexible and responsive to its membership, the IDSN will continue to build bridges of communication and data exchange among the public service organizations of the state. Ultimately, this network of data sharing will help make GIS at every level more useful, comprehensive, and relevant as a problem solving tool for the 21st century. ❑



Source: Legislative Service Bureau; County Outline derived from U.S. Bureau of Census - Tiger Line Files.