

The Technology Toolbox™

from the Environmental Agenda of
Governor Parris N. Glendening



Presented by the
Maryland State Government Geographic Information Coordinating Committee

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Introduction

In 1996, Governor Parris N. Glendening announced a series of initiatives referred to as the "Neighborhood Conservation and Smart Growth" program. These initiatives provide for wise management of Maryland's population growth and show how to fulfill the recommendations of President Clinton's Council on Sustainable Development. Sustainable development as adopted by the President's Council (from "Our Common Future," by the Bruntland Commission) is defined:

"Sustainable Development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

The President's Council also adopted the following Vision Statement to guide their efforts in building a consensus on key issues related to sustainable development.

"Our vision is of a life-sustaining Earth. We are committed to the achievement of a dignified, peaceful, and equitable existence. A sustainable United States will have a growing economy that provides equitable opportunities for satisfying livelihoods and a safe, healthy, high quality of life for current and future generations. Our nation will protect its environment, its natural resource base, and the functions and viability of natural systems on which all life depends."

As approved by the General Assembly, the Governor's program provides solutions to implement growth strategies. Through this package of administrative and legislative initiatives, Maryland hopes to:

- revitalize its urban centers and attract population growth back to them;
- support properly planned development, with a focus on reducing suburban sprawl and protecting sensitive areas;
- reduce stress on its transportation networks;
- make better use of existing infrastructure including roads, water and sewer lines, schools, and existing vacant commercial facilities;
- improve the economy at a sustainable rate with social benefits including jobs, affordable housing, and pride in community; and
- focus on people's needs NOT planners' dreams.

These powerful thoughts call for a new degree of cooperation among all levels of government, the private sector and Maryland's communities. True partnerships between the public and private sectors will help guide Maryland's growth well into the 21st century, and provide opportunities for our future generations to sustain positive economic growth and enjoyment of Maryland's diverse and plentiful natural resources.

To reach the goals of the Governor's "Neighborhood Conservation and Smart Growth" programs, all government and private sector entities must increasingly support each other through development of improved technologies and data sharing. This effort starts with the Technology Toolbox which is a series of coordinated efforts by State government agencies. The Technology Toolbox provides "prepackaged" data for geographic information systems (GIS), and connection to existing information systems that facilitate better land use and planning decisions to help achieve sustainable development.

This document outlines the concepts of the Technology Toolbox™ and provides an understanding of its component parts.

The Approaches to Providing Turn-Key GIS

Visionary employees in the public and private sectors have long heralded various GIS technologies as efficiency tools. However, many of these individuals have been unable to carry out their visions for a variety of reasons. They have not fully implemented GIS technologies in government and the private sector because of the lack of knowledge about system integration, **cost of data development**, lack of adequate budget appropriations, and

significant training requirements. Using the combined resources of Maryland State government agencies, the Technology Toolbox™ will overcome these problems by providing the following three approaches.

Approach One: Maryland State government agencies are creating vast quantities of digital data that sophisticated GIS users can effectively use in their own systems. This option gives end-users the flexibility and power to use the data in an environment that they designed to meet their needs. To simplify acquisition of the data, the Maryland State Government Geographic Information Coordinating Committee (MSGIC) publishes a resource guide listing the types of data available, and the agency contacts that will help a user to obtain the data. Selected agencies have entered into agreements with private sector firms to redistribute their data, thereby providing a wide range of enhancement options that are driven by market conditions.

Approach Two: Four Maryland State government agencies are coordinating the release of their GIS data in consistent formats. This approach was devised after the introduction of the MdProperty View property map and parcel information system by the Maryland Office of Planning. The software is readily available and inexpensive, as are training programs on its use, including training specifically tailored to use of State-produced data. MSGIC has approved private vendors to redistribute these data in a coordinated partnership between the public and private sectors.

Approach Three: The Maryland Department of Natural Resources maintains the MERLIN System (Maryland's Environmental Resources and Land Information Network). It is an electronic atlas system designed to put a wide variety of data used in management planning at the fingertips of DNR employees. DNR intends to market access to this system for public use late in the fall of 1998.

These three technically-sound approaches give the end-user a range of choices regarding power features, ease of use and cost of implementation. The remainder of this plan outlines, in increasing detail, the requirements for carrying out each of these approaches.

Role of State Agencies

Sections 10-901 through 10-906, inclusive, of the State Government Article regulates sales of data produced by State government agencies. This law allows State agencies to charge reproduction costs and reasonable portions of development costs for data. Each agency has developed somewhat different policies regarding data distribution that fall within the scope of this statute. However, a key provision is that persons (entities) similarly situated should be charged the same amount for data. This is generally interpreted as government and public organizations versus private business entities with different pricing policies for each group.

Development of some data products is funded by zero-base budget programs. This means that if they did not recover part of the development costs with each sale, they could not produce or update the data. Production of other data is funded through general or special funds and a variety of grant programs. In these cases, the cost of data normally reflects a policy for recovering only the distribution costs. Certain data are distributed at no charge, and using Internet file servers that reduce the cost of data distribution for the agencies will ultimately simplify acquisition.

The Maryland State Government Geographic Information Coordinating Committee has adopted a standard license agreement for spatial data products. It is used as a guidance document for State agencies wishing to develop license agreements. This helps to keep the "boiler plate" language consistent, although the overall appearance of the license agreements may be very different.

Sophisticated users of GIS data products can call or E-mail the contacts listed in Appendix A to obtain a copy of MSGIC's 1997 GIS Resource Guide. The Resource Guide is the most comprehensive list of available digital data products.

Data Prepared for Use with MdProperty View

The Maryland Office of Planning developed MdProperty View to simplify the way in which property information for Maryland's 23 counties and Baltimore City is gathered and used. This exciting new release is a visually accessible database that allows users to browse a jurisdiction's property maps and parcel information by

looking at a map on a computer screen, zooming in on an area of interest, and clicking on a point within the property to display the database record associated with that parcel.

All it takes to be up and running is a standard personal computer, a copy of an off-the-shelf geographic information system program operating in a Windows environment, and the property maps and parcel data in project files provided by the Office of Planning on CD ROM.

In finding the property maps and parcel data, satellite imagery helps the user establish a visual frame of reference. The State Highway Administration's digital street maps, also available in the system, help in establishing location. Any computer user familiar with simple mouse functions can move around the jurisdiction seamlessly and then zoom in on an area of interest to display the property maps and the parcel ownership data. Once the user has located the property (properties) they are interested in, they simply point-and-click the mouse on an intelligent point within the parcel and up pops a window displaying the parcel database record. Conversely, parcels identified in the database can be displayed graphically on the map. Database queries can also identify properties with certain characteristics. The result of a query can be displayed geographically on the map or the data can be exported to create a new database, to create mailing labels, or for use in other available software applications.

To broaden the uses of this product, other State government agencies are packaging a variety of base maps and thematic data to work with MdProperty View. These data provide the basis of an incredibly powerful "turnkey" GIS system for entities involved with land management, business development, or planning issues. Where available, the additional prepackaged data include:

digital orthophotography	digital 7.5' USGS quadrangle maps
watershed boundaries	wetlands inventory
critical area boundary	100-year and 500-year floodplain boundaries
federally-owned lands	DNR-owned lands
environmental easement areas	agricultural easement areas
private conservation lands	agricultural conservation districts
county parks	land use and land cover
digital elevation models	sensitive species project review areas
legislative districts	historic preservation easements
Congressional districts	archaeological sites (absence or presence grid)
small area census data	inventory of Maryland historic sites
highway GRID maps	National Register of historic sites

By adding these and other data to the existing MdProperty View system, the user can evaluate the relationship of property ownership with any combination of these features to facilitate better management decisions.

Training will be required to effectively use GIS software and understand the proper uses of the various data being provided. Many certified training programs are provided by the private sector and the Maryland Office of Planning which has partnered with Towson State University to offer training courses specifically tailored to the MdProperty View system.

The start-up cost of installing a fully-functional system for a single Maryland jurisdiction is under \$7,500 for an adequate computer, GIS software, a copy of MdProperty View, the remaining data and training. Annual costs for updates of MdProperty View range from \$350 to \$750 depending on the county. The annual renewal fee for MdProperty View supports the non-general funded staff, computer equipment and related costs associated with the ongoing maintenance and updates to the State's 2,800 property maps. Users may also want to buy releases of the other data at additional expense to ensure the information in their system is current.

Connection to the MERLIN System

MERLIN is an electronic atlas designed by the Maryland Department of Natural Resources to be an on-line "library" of various maps, regulated areas, data, indexes, photographs and other information that DNR employees use on a daily basis. Its power comes from combining data produced by DNR with data produced by other government and private sources to provide all necessary information in one system that allows a user to quickly and easily visualize the data.

The MERLIN System at DNR is a client/server computer system that stores data on a series of servers with over 100 gigabytes of hard drive storage. Most types of computers can reach these servers across the DNR network to use MERLIN's data. DNR is also planning future access by the public (e.g., consulting or engineering firms, and community organizations) for the fall of 1997 through use of in-house facilities and new wide area network technologies.

Current wide area network technologies do not provide cost-effective ways to move the large quantities of data required to operate the MERLIN System. New alternatives to existing wide area network technology have been recently announced. They include satellite transmission, new low cost higher speed phone line technologies, and operating in the Windows NT 4.0 environment with multiple modems on one computer.

Connection to the MERLIN System provides a simple interface for the end user and eliminates the need for maintaining a GIS system at the user's facility, or having to import and manage data updates. As an electronic atlas, MERLIN will not allow the end user to perform many standard GIS functions such as combining or buffering data sets to create new data layers. Therefore, it is designed for the end user who merely needs to obtain existing information, and see the relationship of various theme layers to each other, to parcels, and to the various base maps in the system.

Due to wide area network connection fees and royalty fees for data access, the actual cost of connecting to the MERLIN System from a remote site is unknown at this time. Private vendors may eventually license backup copies of the MERLIN System from the Department of Natural Resources to provide it at customer sites or across individually maintained wide-area networks.

The Role of the Private Sector

To promote increased partnerships and coordination under the "Neighborhood Conservation and Smart Growth" initiatives, the member agencies of MSGIC have solicited nonexclusive partnership agreements to market data, provide additional services, and integrate the efforts of the various agencies. Therefore, private service firms (Resellers) may market turnkey GIS systems, including hardware, software, data and training that meet the needs of their customers. In addition, Resellers can provide services to integrate state-produced data on a customers existing GIS system.

Upon sale of State agency data, the vendors will forward payment to the State agencies according to the agreements. Such partnerships promote small business development, reduce workloads on government agencies, promote the use of publicly produced data and foster wise management decisions based on sound science and factual information.

Several State agencies have maintained nonexclusive agreements with private sector firms to redistribute certain data and provide other data management services to the public that otherwise cannot be reasonably expected from State agencies. They are seeking additional partners to increase the use of state-produced data.

Financial Assistance for Local Government and Not-for-Profit Organizations

The 1997 Session of the General Assembly approved a grant program from the Information Technology Fund. MSGIC is coordinating this program which underwrites up to \$3,000 of the cost of providing data and training

to a city or county agency and up to \$9,000 for selected regional planning councils and non-government organizations. It will also coordinate delivery of data products with resellers and grantees.

Whatever the outcome of the grant program, the three approaches outlined by this document are viable and will be carried out by the appropriate State agencies. Many State agencies are currently delivering their data on demand. The coordinated effort to provide "bundled" packages of data to work with MdProperty View will be in full effect by May 31, 1997. Public access to the MERLIN system is expected by November 1997.

Role of the Universities and School Systems

Several of Maryland's universities and community colleges already offer a wide range of degree programs that have a special emphasis in urban and regional planning, and operation and maintenance of geographic information systems. In addition, they offer short courses and workshops in a variety of related topics. MSGIC will work with academia, local government and the private sector to offer a comprehensive series of short courses, workshops, and degree programs that will provide for the educational needs of all people operating these systems. Training is required for proper GIS operation and maintenance which involves many technical disciplines. It is also necessary to prevent misuse or misinterpretation of the data being offered.

MSGIC will inventory existing programs and review the course offerings with the private sector and local government to determine components that may be missing. Future course offerings should fill the voids and provide training for:

- mid-career professionals who have had no experience with GIS;
- mid-career professionals who are working with GIS technologies without the requisite training or appropriate skills; and
- current students about to enter the workforce.

GIS education should provide comprehensive training for students wanting to pursue GIS management as a career, and basic skills training for most other students. Many people confuse the use of GIS as a substitute for many scientific disciplines. GIS education cannot replace a strong foundation in the discipline chosen by a student (e.g., wildlife management, transportation planning).

Management of data resources in the next decade will be increasingly accomplished using spatial references. Therefore, Maryland's schools (K-12) must renew efforts to teach our young citizens spatial concepts and improved geography skills up to, and including, the use of GIS technologies. Improving these skills in children will help them be better prepared for the world in which they will work. Working with MSGIC and a private software vendor, the Department of Natural Resources produced an electronic atlas of Maryland's Coastal Bays to be used as a tool in educational programs. It will be available in June 1997.

Summary

The Governor's vision of "Neighborhood Conservation and Smart Growth" will be implemented through a variety of programs designed to help local governments in revitalizing Maryland's urban centers, properly planning development, and protecting what makes Maryland unique - our treasured Chesapeake Bay, our diverse landscapes, our living and natural resources, and our people.

Technology plays an important part in facilitating wise management practices. The three approaches outlined in this plan represent an effort by Maryland State government agencies to make the power of GIS available to local government agencies and not-for-profit organizations who otherwise could not afford it. An average investment of well under \$10,000 will provide access to data ranging in value from \$200,000 to several million dollars depending on the choices made.

For further information regarding the Technology Toolbox™, please contact the individuals listed in Appendix A.

APPENDIX A

State Agency Contacts

MdProperty View and other OP Products

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Maryland Office of Planning
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MERLIN and other DNR Products

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Chesapeake and Coastal Watershed Service
Geographic Information Services Division
Tawes State Office Building D-2
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Historic and Archaeological Data

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Maryland Department of Housing and Community Development
Maryland Historical Trust
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Floodplain Data

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