

MICROSTATION[®] GEOOUTLOOK[®]

MicroStation GeoOutlook is a standalone data access and decision support tool for mapping and GIS applications. It provides an easy-to-use environment designed to complement MicroStation-based mapping projects that are built in MicroStation and MicroStation GeoGraphics[®].

MicroStation GeoOutlook includes features for map data querying and access, basic spatial analysis, data presentation and reporting. It also provides support for simultaneous viewing of vector and raster data. MicroStation GeoOutlook is optimized for use with MicroStation GeoGraphics and supports all standard MicroStation GeoGraphics project components. MicroStation GeoOutlook supports connection to a variety of databases.

As mapping and GIS projects often have widely varying requirements, MicroStation GeoOutlook is highly customizable and includes tools for user interface customization and applications development.

MicroStation GeoGraphics Project Support

As MicroStation GeoOutlook is primarily designed as a data access extension for MicroStation GeoGraphics, it supports all standard MicroStation GeoGraphics project components, including the category and feature structures, Map Manager, Display Manager and Feature Manager.

MicroStation GeoOutlook supports the use of MicroStation GeoGraphics export files for working offline from the database. MicroStation GeoGraphics export files contain an encapsulated definition of project data, including categories, features and maps.

Redlining

MicroStation GeoOutlook lets you note comments and changes, including additions and deletions. It employs an “overlay” technique that places all redline information in a separate file that has an “.rdl” file extension. The design file is attached to this redline file as a MicroStation (read-only) reference file, thereby ensuring the integrity of the original design file.

Map Management

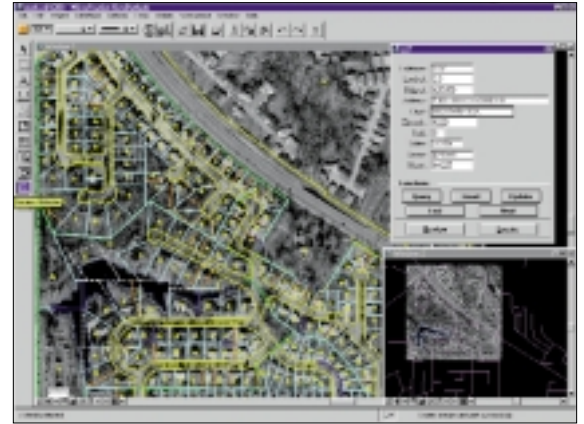
MicroStation GeoOutlook includes a map management system that gives you a simple way to access individual maps within a project. MicroStation GeoOutlook’s Map Manager is a point-and-click interface that provides categorical map access, key map display, a spatial map index and a variety of map selection modes, including point, fence, shape, view and all.

Seamless Map Indexing

Map Manager is extended to support an optional automated file attachment mode. In this mode, files are automatically attached and detached based upon the current view. This means that as you pan and zoom, the current view extent is compared to the map index to determine which files should be attached and detached. This automated attachment mode also filters which maps are attached and detached by category, based upon which features are set for display in the Display Manager. Seamless mapping also allows for the inclusion of images that have been previously indexed within an existing MicroStation GeoGraphics project.

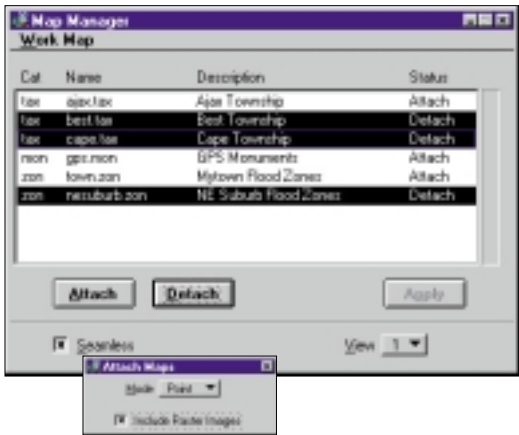
Image Support

Through its image management capabilities, MicroStation GeoOutlook



MicroStation GeoOutlook provides an easy-to-use, point-and-click interface for reviewing database attributes.





Map Manager includes features for seamless mapping, integrated image access and multiple map selection.

MicroStation GeoOutlook is a standalone data access and decision support tool for mapping and GIS applications.

provides access to a wide range of image data, including aerial photographs, satellite imagery and scanned maps and drawings. This high-performance image engine supports the display of bitonal, grayscale and continuous tone images that can supplement vector maps and provide additional visual information for geographic analysis.

Thematic Resymbolization

MicroStation GeoOutlook includes Thematic Resymbolization tools that allow you to create a wide variety of maps using the comprehensive set of data-driven tools. These tools use database attribution to control element resymbolization and area filling and patterning. Also included are functions for automatic data classification and legend generation. MicroStation GeoOutlook has a rich set of annotation tools that create text labels from database information.

MicroStation GeoOutlook can run an automatic classification operation based upon a single column in a single selected database attribute table. You can define more advanced classification schemes using thematic customization tools, which also allow you to manually create thematic classifications. Additional options allow you to define a global query clause for filtering data items, including a fence-based filter for building classification lists.

Thematic Resymbolization is also integrated with the Query Builder, which limits the amount of manual typing required to create thematic queries. Query Builder integration also provides support for table joins.

Database Support

MicroStation GeoOutlook supports a variety of database operations, including query, edit, update and geo-locate. MicroStation GeoOutlook supports connectivity to all relational database management systems supported by MicroStation GeoGraphics using direct database servers and ODBC. MicroStation GeoOutlook uses MicroStation database server software and, as such, allows full edit and update capabilities to associated database tables. MicroStation GeoOutlook provides two primary facilities for interacting with associated database attributes: Visual Query Builder and Database Dialog Forms.

Visual Query Builder

MicroStation GeoOutlook includes an enhanced Query Builder that lets you build customized database queries. The Query Builder includes an interactive

definition tool that includes table selection, column selection and visual definition of join relationships between tables. Query conditions are input through a point-and-click dialog box and options are included for sorting and aggregate grouping functions. When a query is executed a database dialog form is automatically triggered. This opens a dynamic dialog form that displays the results of the query. Queries can be saved as standard SQL query statements available for later recall.

The Query Builder tool is integrated with other MicroStation GeoOutlook features that optionally use database queries, including thematic resymbolization, annotation and topology layer creation.

Database Dialog Forms

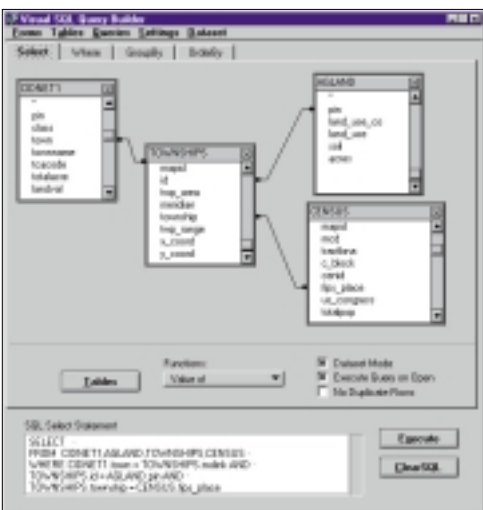
Database dialog forms tools lets you create, edit and save database forms by interactively defining form contents and dialog box controls. Database forms support row navigation operations, including find first row, last row, next row and previous row, plus row count. Database update and query operations include query execute, row insert, row update and row delete. Database dialogs support integrated database and graphics operations, including query, update, review and geo-locate.

You can customize the organization of the dialog box and associated controls using the visual editing tools in the dialog form builder. Individual data fields can be set to read-only in order to maintain database integrity. Once a form has been created, it can be used to query and review database attribution using query functions that allow you to enter values and operators directly into form fields.

Spatial Analysis

MicroStation GeoOutlook has a variety of topologically based spatial analysis tools that include polygon-to-polygon overlay, point-in-polygon overlay, line-in-polygon overlay and buffer generation. All of these tools operate using on-demand topology layers that compute spatial relationships on-the-fly.

The SQL-filtering option in the Topology Analysis tool includes integrated access to the Visual Query Builder. Query statements can be copied from the Visual Query Builder, thus preventing you from retyping complicated statements.



The Visual Query Builder allows you to visually define join relationships between tables.

GeoDefiner

GeoDefiner allows you to define a coordinate system for your map. Once a coordinate system is defined, a read-out of latitude/longitude (or any reference coordinate system) can be obtained.



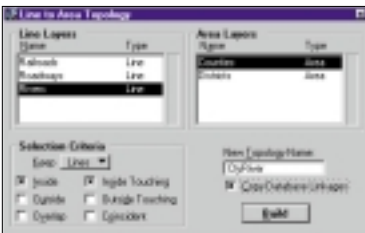
GeoDefiner can:

- Create a coordinate system definition
- Use the Select Reference command to read the coordinate system definition of the reference file into the Reference Coordinate System
- Track coordinates based on the Master or Reference Coordinate System

Network Analysis

MicroStation GeoOutlook provides basic network modeling and analysis functionality for directed, weighted, linear networks. From a generated network, you can trace the following:

- **Shortest Path**—Trace the shortest distance between two points along network edges based on edge and node cost
- **Radial Search**—Create a network of edges that radiate from a point based on edge and node cost and user-defined distance
- **Trace-forward**—Create a network of edges from a point following the forward direction of the elements
- **Trace-back**—Create a network of edges from a point following the reverse direction of the elements



Spatial analysis tools include multiple selection criteria and integrated access to the Visual Query Builder.

MicroStation GeoOutlook includes features for map data querying and access, basic spatial analysis, data presentation and reporting.

Customization

MicroStation GeoOutlook has a range of customization tools that is accessible to users of all skill levels. You can customize MicroStation GeoOutlook using the MicroStation Development Language (MDL[®]) programming environment. MicroStation GeoOutlook can run MDL applications developed in MicroStation and MicroStation GeoGraphics.

MicroStation GeoOutlook includes the Java Virtual Machine, licensed from Sun Microsystems, Inc. Extensions to the Java DGN package provide access to all project data including category, feature, map and command information. Topology classes have been provided for building and intersecting topology layers. MicroStation GeoOutlook includes support for JDBC access to databases and a host of native Java third-party development tools for database forms.

MicroStation GeoOutlook includes easy-to-learn-and-use programmability through MicroStation BASIC. MicroStation BASIC can

be used to combine different MicroStation GeoOutlook tools into workflow-specific applications. The MicroStation BASIC macro record facility provides a simple, effective way to create MicroStation BASIC scripts by simply recording the steps involved in a repetitive process. The comprehensive development environment includes an editor, debugger, compiler and dialog box builder.

MicroStation GeoOutlook also includes support for OLE Automation. MicroStation GeoOutlook can expose its functionality to other OLE-driven applications through the use of a development environment such as Microsoft Visual Basic.

All customization tools are limited to automate workflows for viewing, redlining, analysis and plotting. With MicroStation and MicroStation GeoGraphics it's possible to create your own customized data creation and editing workflows.

Bentley and GIS

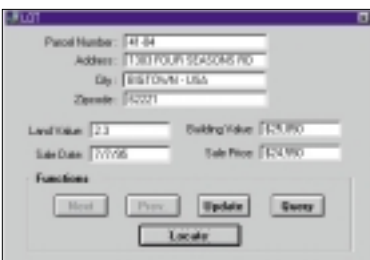
Bentley, a member of OpenGIS[®] Consortium, is a leader in the geoenvironmental segment of GIS. Bentley's MicroStation GeoGraphics, MicroStation GeoOutlook and Viecon[™] Publisher provide a platform for users to plan, design, engineer, operate and maintain spatial assets. Bentley offers—together with its Bentley Integrators and Resellers—complete geoenvironmental applications for Government, Utility and Telecommunications users.

About Bentley

Founded in 1984, Bentley Systems, Incorporated is a premier technology supplier dedicated to improving the process of designing, building and operating permanent assets such as buildings, roadways, manufacturing and utility and telecommunications networks. The professionals who use Bentley technology include architects, engineers, constructors and owner/operators. Bentley's MicroStation and Viecon technology and services make Bentley the leader in the Engineering, Construction and Operations (E/C/O) market.

Bentley's reach spans the globe, serving more than 300,000 professionals and over 20,000 companies and organizations. It is the largest privately held company in the 2001 Soft-letter 100. More than 200,000 Bentley users participate in the Bentley SELECT[®] technology and service subscription program.

More information about Bentley is available at www.bentley.com.



Database dialog forms can be customized to more clearly present important attribute information.

MicroStation GeoOutlook Technical Specifications

PC System Requirements

- Intel-compatible PCs running Microsoft Windows NT 4.0 and Windows 95, 98, 2000
- 16 MB minimum RAM; 24 MB recommended
- 100 MB hard disk
- Input device: Mouse or tablet
- Supported graphics card (256-color card recommended)
- A host of industry-standard output devices are supported

Features

MicroStation GeoGraphics Project Support

- All standard MicroStation GeoGraphics project components
- Category and feature structures
- Map Manager
- Display Manager
- Feature Manager
- MicroStation GeoGraphics export files for working offline from the database

Redlining

- Note comments and changes, including additions and deletions
- Redline information is stored in a separate file (.rdl)
- Design file is attached as a reference file to maintain its integrity

Map Management

- Simple way to access individual maps within a project
- Categorical map access
- Key map display
- Spatial map index
- Variety of map selection modes including point, fence, shape, view and all
- Seamless mapping option
- Integrated image access

Thematic Resymbolization

- Create a wide variety of maps using comprehensive data-driven tools
- Control element resymbolization and area filling and patterning
- Automatic data classification and legend generation
- Annotation tools that create text labels from database information
- Advanced classification schemes using thematic customization tools
- Manual creation of thematic classifications
- Integrated query builder with support of table joins

Database Support

- Oracle
- Microsoft Access
- Sybase
- Informix
- SQL Server

Visual Query Builder

- Build customized database queries
- Interactive query definition tool
- Point-and-click table selection and column selection
- Visually define join relationships between tables
- Automatic creation of dynamic dialog forms containing query results
- Queries can be saved as standard SQL statements for later recall
- Integrated in other MicroStation GeoOutlook features, including thematic resymbolization, annotation and topology analysis

Database Dialog Forms

- Support row navigation operations
- Support update and query operations
- Support integrated database and graphics operations
- Create, edit and save database forms by interactively defining form contents and dialog controls
- Customizable through the use of visual editing tools in the dialog builder
- Query and review database attribution using query functions directly in form fields

Spatial Analysis

- Polygon-to-polygon overlay
- Point-in-polygon overlay
- Line-in-polygon overlay
- Buffer generation

Customization

All customization tools are limited to automate workflows for viewing, redlining, analysis and plotting

- MicroStation Development Language (MDL) programming environment
- Java and JMDL
- MicroStation BASIC development environment
- Support for OLE Automation

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U.S. Pat. Nos. 5,815,415; 5,784,068 and 6,199,125

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