

Product Review: Maptitude 3.0

Executive Summary

MAPTITUDE® 3.0 for Windows is a stunning new entry into the desktop mapping and GIS software category. MAPTITUDE is a full-featured GIS software package that includes comprehensive nationwide and worldwide data sets that will meet the needs of most business users, at the remarkably low price of \$395.

MAPTITUDE is not just inexpensive; it is a technical tour de force. Drawing upon the underlying technology from its high end GIS products, Caliper™ has packed MAPTITUDE with powerful features and performance unmatched by any software at any price.

MAPTITUDE provides the full range of mapping, data management, and spatial query tools that are expected in this class of product. In addition, MAPTITUDE provides routing, nationwide address matching, multi-band buffering, and powerful spatial analysis functions that have never been available before in the desktop GIS market. MAPTITUDE also provides the best support for Windows of any mapping software, including built-in support for OLE 2.0 and ODBC.

Despite the rich functionality, MAPTITUDE is very easy to use. In most instances the software will automatically do the right thing to accommodate novice users, while providing experienced GIS users with all of the flexibility to customize analyses and results. MapWizard™ automatic mapping technology allows users to create colorful and informative maps with only one or two mouse clicks. The User's Guide, with its clean design and eye-catching graphics, sets a new standard of excellence for clarity and readability.

MAPTITUDE includes two data CDs that provide geographic data sets for the US and the world. One CD represents an astonishing technological breakthrough by providing detailed street level geography for the entire US in address-matchable form. The second CD contains extensive geographic boundary files and demographic data. MAPTITUDE also lets you use data from databases, spreadsheets, and other desktop mapping, GIS, and CAD products.

MAPTITUDE is the complete geographic package that business users, GIS profession-

als, teachers, and map enthusiasts have been waiting for. All in all, MAPTITUDE is the most capable mapping package we have ever seen. It should handily meet the needs of all but the most esoteric applications.

Introduction

Geographic Information Systems (GIS) is a technology waiting to happen. Business use of GIS has been hampered by the cost of the software, the cost and availability of geographic data sets, and the limited functionality of desktop products. Caliper Corporation has addressed all of these issues with MAPTITUDE 3.0 for Windows, a remarkable new entry in the desktop mapping and GIS marketplace. For \$395, MAPTITUDE provides full-featured GIS software accompanied by world and nationwide data sets that will meet the application requirements of many users. Most importantly, all of these features are presented in a simple, easy-to-use package that brings GIS into the mainstream and will leave many people wondering, "How did they do it?"

MAPTITUDE Version 3.0 is undoubtedly the most capable and least expensive full-featured GIS package for Windows. MAPTITUDE includes all of the data that most users require for their applications, and upstages desktop mapping veterans MapInfo and Strategic Mapping (the producer of Atlas GIS for Windows), who sell the same

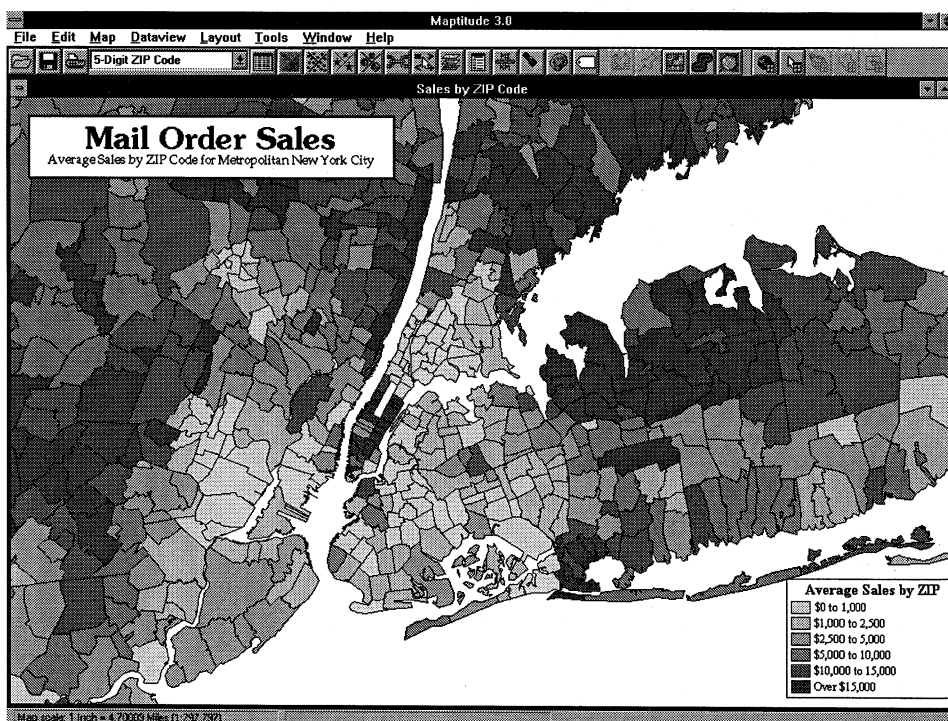
geographic data at grossly inflated prices.

MAPTITUDE Version 3.0 is designed to meet the requirements of both first-time and experienced business GIS users. Those who are frustrated with the limitations of other systems, as well as those who are investigating the capabilities of GIS, will find almost everything they need in MAPTITUDE.

One of the most astonishing features of MAPTITUDE is the Caliper Streets file, a geographic file that contains over 32 million streets across the United States stored on a single CD. This file retains every bit of geographic detail contained in the U.S. Bureau of the Census TIGER/Line files (the source of street data for most desktop mapping systems) with a large number of improvements and enhancements. The speed of display is amazing (even with a somewhat outdated double-speed CD-ROM drive) rivaling that of other systems using data stored on a hard disk. Even more amazing, Caliper has retained complete address and ZIP Code information throughout the file. MAPTITUDE answers the prayers of all desktop mapping users by making address matching of nationwide data sets practical and affordable.

Product Overview

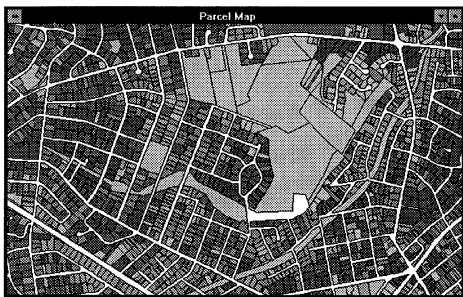
MAPTITUDE lets you create and work with three types of windows: maps, dataviews,



and layouts. Maps show geographic features and their characteristics in an electronic version of a paper map. Dataviews display information from geographic files, databases, or spreadsheets in tabular form. Layouts bring any number of maps and dataviews together in a single presentation.

You create maps by adding layers of information stored in one or more geographic files. These geographic files can include ones that come with the product and ones you create. You control the order in which layers are drawn, and the styles with which each layer is displayed. Autoscaling lets you set up the map so that different levels of detail are shown automatically at different scales.

Dataviews let you display and edit data from individual files, but also let you create joined views and virtual tables that connect any number of sources together. The dataview provides a window onto your data, with extensive control over how they are displayed. For example, you can rearrange columns, sort the records, and add formula fields to a dataview, without affecting the underlying tables in any way. You can also use a dataview to update the information in your source tables.



Number	STREET	Sale Price	Total Assess	Style	Year Built
27	SOLON ST	327500	261500	COLONIAL	1930
11	CRYSTAL ST	515000	409100	VICTORIAN	1850
52	HANCOCK AVE	300000	280000	OTHER	1885
1314	WALNUT ST	209500	178800	COLONIAL	1940
1401	WALNUT ST	270000	184700	COLONIAL	1938
1395	WALNUT ST	205000	186900	OLD-STYLE	1928
39	TARLETON RD	245000	193200	COLONIAL	1926
15	ROGERS ST	310000	258700	COLONIAL	1915
45	NEWBURY ST	150000	155100	RANCH	1950
1002	BEACON ST	375000	305400	VICTORIAN	1900
25	WOODCLIFF RD	325500	287700	VICTORIAN	1896
1381	WALNUT ST	169000	189200	COTTAGE-BNGL	1929
59	CHARLOTTE RD	283600	223900	COLONIAL	1930
47	CHARLOTTE RD	325000	218900	COLONIAL	1928
5341	WALNUT ST	184000	183100	OLD-STYLE	1930

Map	STREET	Year Built	Style	Price	Assess	Area
1	WALNUT ST	1930	COLONIAL	270000	184700	10000
2	WALNUT ST	1938	COLONIAL	270000	184700	10000
3	WALNUT ST	1928	OLD-STYLE	205000	186900	10000
4	WALNUT ST	1940	COLONIAL	209500	178800	10000
5	WALNUT ST	1930	COLONIAL	327500	261500	10000
6	WALNUT ST	1850	VICTORIAN	515000	409100	10000
7	WALNUT ST	1885	OTHER	300000	280000	10000
8	WALNUT ST	1915	COLONIAL	310000	258700	10000
9	WALNUT ST	1950	RANCH	150000	155100	10000
10	WALNUT ST	1900	VICTORIAN	375000	305400	10000
11	WALNUT ST	1896	VICTORIAN	325500	287700	10000
12	WALNUT ST	1929	COTTAGE-BNGL	169000	189200	10000
13	WALNUT ST	1930	COLONIAL	283600	223900	10000
14	WALNUT ST	1928	COLONIAL	325000	218900	10000
15	WALNUT ST	1930	OLD-STYLE	184000	183100	10000



Using layouts, you can design a presentation quality page of any size that combines any number of maps and dataviews, and print the result on any Windows-supported printer. The layout window provides a set of tools for aligning and justifying maps and dataviews, and a full-featured set of drawing tools for adding text, symbols, and other graphics.

MAPTITUDE lets you create and work with any number of maps, dataviews, and layouts. You can save and restore each type of file individually, or use a workspace to save and restore the contents of all open windows.

Setup and Installation

The installation program is simple and easy to use. MAPTITUDE is installed from a set of six diskettes. Installation options are presented in a menu, and you are carefully led through the installation process by a series of prompts and status bars. When you install the software, you can copy one or more "speed up" files from the Caliper Data CDs to your hard disk or file server to improve performance.

MAPTITUDE can be installed on a standalone PC or on a network file server. If MAPTITUDE is installed on a file server, a single user license must be purchased for each simultaneous user.

Read-only geographic files and all types of tabular data can be shared over a network with no changes to your configuration. If you want to share geographic files in editable format, so that several users can be editing and updating the maps simultaneously, you must install a network lock manager and install NETBIOS support on both network clients and the server. The lock manager serves as a traffic cop during multi-user database transactions.

Making Maps

If you want to make maps, MAPTITUDE is the software for you. MAPTITUDE lets you create dozens of different types of maps, and provides a wealth of colors, patterns, and styles for displaying map features. You can show point features using any TrueType font symbol, and choose from over one hundred different line styles, fill colors, and fill patterns when displaying line or area features. MAPTITUDE includes three TrueType fonts loaded with symbols you can use in your maps.

MAPTITUDE provides a complete set of mapping tools that will satisfy the requirements of new GIS users as well as statisticians, cartographers, and other professional GIS users. Novice users can create professional looking maps with ease, while advanced users will appreciate the breadth of

mapping features and the ease with which maps can be customized and tailored.

MAPTITUDE includes all the standard types of thematic maps (color, scaled-symbol, pie chart, bar chart, dot-density), and adds a few new types, including multivariate dot-density maps.

While most other mapping packages offer a wide variety of map styles and options, they also require the user to wade through a series of dialog boxes and answer a large number of questions to achieve the desired result. MAPTITUDE has broken through this barrier with the MapWizard, a trademarked feature that produces informative and attractive maps with one or two mouse clicks. To use the MapWizard you click on the column or columns of data you want to see, and then click the MapWizard button. The MapWizard scans the data and automatically creates the map for you, choosing appropriate colors, symbols, and styles. As with most mapping packages, you can go back and customize virtually every aspect of the map, and you can also change the default settings that are used by the MapWizard.

MAPTITUDE lets you customize maps for any application. Drawing tools let you add text, symbols, shapes, lines, and bitmap graphics to your maps. Comprehensive legend control lets you modify the size and location of the map legend, with full control over the contents. You can choose from many different styles of map scales and north arrows.

MAPTITUDE is the first desktop GIS that does a reasonable job of labeling maps. MAPTITUDE has dynamic labeling, which automatically adapts the labels on a map as you change the map scale and center. You choose the fields that should be used to label the map, and set the font sizes, styles, and priority for each layer. From then on, MAPTITUDE makes sure that the map is consistently readable and informative.

For example, you can choose to give highest label priority to large-volume customers, and the lowest label priority to streets. Each time the map is drawn, MAPTITUDE labels the largest customers first, then the smaller customers, and then the streets, making sure that none of the labels overlap. You can even choose to label only the selected customers or selected streets. MAPTITUDE also makes it easy to locate labels manually, so you can precisely adjust the location of each one.



In short, MAPTITUDE provides all of the tools you need to quickly and easily create maps for business, government, education, or recreation.

Putting Your Data on the Map

MAPTITUDE provides many different tools to let you see and manipulate your own data on a map. Joined views let you link your own data tables directly to existing map layers. This makes it easy, for example, to produce maps showing sales and marketing data by state, county, ZIP Code, or other areas. Pin mapping creates a new point feature for every record in your data file, and is ideal for showing the locations customers, retail sites, and prospects. Both of these capabilities are easy to use.

Joined Views

To create joined views, you link your table to a map layer based on a common field, such as ZIP Code, state name, or sales district. Once you create the joined view, any field in the joined view can be used to create thematic maps, add labels, or perform geographic analysis. You can also use the MapWizard with fields in a joined view, so that you can both link in your data and produce beautiful maps in seconds. Once you create a joined view, you can display and edit the data in a dataview window, just like any other database.

MAPTITUDE provides intuitive tools for creating joined views, and supports one-to-one, many-to-one, and one-to-many joins. For example, MAPTITUDE will automatically count up the number of customers in

each ZIP Code, and compute the total sales, averages sales, and any other relevant statistics. Or, you can attach demographic information about a state to sales territories within that state. MAPTITUDE also allows any number of joins between a map layer and tabular data files. For example, you can link a map of sales regions to four tables containing sales for 1991, 1992, 1993, 1994, and then use the MapWizard to make a bar chart map showing sales trends by region.

Pin Mapping

MAPTITUDE provides highly effective pin mapping tools that create new point layers to use in your maps. You can pin map your data using addresses, ZIP Codes, or other data such as city, state, or sales district. Pin mapping can be performed in batch mode or interactively. While you would normally use batch mode processing to support business applications, you can have a great deal of fun and impress your friends by using the interactive mode to zoom to any street address, ZIP Code, city, state, county, or landmark in the nationwide data files that come with MAPTITUDE.

MAPTITUDE is the only desktop GIS that supports nationwide street-level address matching and street level mapping from one CD, at no additional cost. The MAPTITUDE address matcher incorporates new and innovative technology for matching addresses against this street file. Flexible street name matching handles missing or incorrect prefixes and suffixes, as well as spelling or data entry errors too serious for most address matchers. For example, if you search for 123 Bain Street, MAPTITUDE will let you know

that Bain Street does not exist, but that 123 Main Street does.

Input addresses are standardized automatically, and you can save the standardized addresses in a file to help identify data problems. MAPTITUDE automatically finds intersections (e.g., "Walnut St & Beacon St") in your input file and locates them correctly, so you don't have to worry about mixing intersections and addresses in your file. Finally, MAPTITUDE includes and automatically uses cross-reference files that determine the city and state from ZIP Code and vice versa when necessary.

MAPTITUDE provides a wide array of options you can choose, including variable levels of strictness in address matching, relaxation of matching rules, and options to check nearby ZIP Codes when no matching address can be found in the designated ZIP Code. For more precise work, you can indicate a fixed offset from the street centerline for each point, or look up the offset based on the street data or on data in the address file.

While MAPTITUDE may not be quite as fast at address matching as some other packages, the increased accuracy and nationwide geocoding capability more than offset the speed difference.

MAPTITUDE also lets you pin map your data by ZIP Code or any other map layer, such as census tract or sales district. Caliper will include ZIP+4 data and pin mapping in future versions of MAPTITUDE. MAPTITUDE is the only package that offers automatic scattering options. This means, for example, that when pin-mapping by ZIP Code you can locate all the records in a ZIP Code at the ZIP centroid, scatter them around the centroid, or scatter them throughout the ZIP Code. The second and third options provide a far more realistic distribution of records on the map.

Spatial Queries

MAPTITUDE is a powerful geographic analysis system that excels in generating answers to geographic questions:

- Which stores are within one mile of the proposed location?
- Where are the census tracts with an average income over \$50,000?
- How many people live within ten miles of the airport?

MAPTITUDE provides an impressive variety of tools for selecting geographic features from a map. You can point to a feature, drag

a circle or rectangle, or draw a shape on the map to select features. You can choose to include the features that are fully enclosed in the shape you draw, or to include features that are partly or fully enclosed.

MAPTITUDE also supports geographic queries that select features based upon their location relative to other features. For example, you can easily find all the customers who are located in high-income counties, or all the prospects within 10 miles of your office.

MAPTITUDE makes it easy to select features based on their attributes. It has a query builder that lets users construct a query by choosing data fields, operators, functions, and sample data values from drop-down lists. You can perform queries on joined views the same way.

You can add, subtract, and combine selection sets in any way you like. For example, select the households in a city with an above-average income, and then select the households within 2.5 miles of a store. Combine the two, and you've identified a target market for your business.

MAPTITUDE is the only desktop GIS product that lets you create and maintain any number of selection sets. Using the special Selection toolbox, you can zoom to a selection set, change how features in the set are displayed, or instantly change the map or dataview to show only the selected features. Reporting is a breeze. You can print a dataview at any time, and you can even add

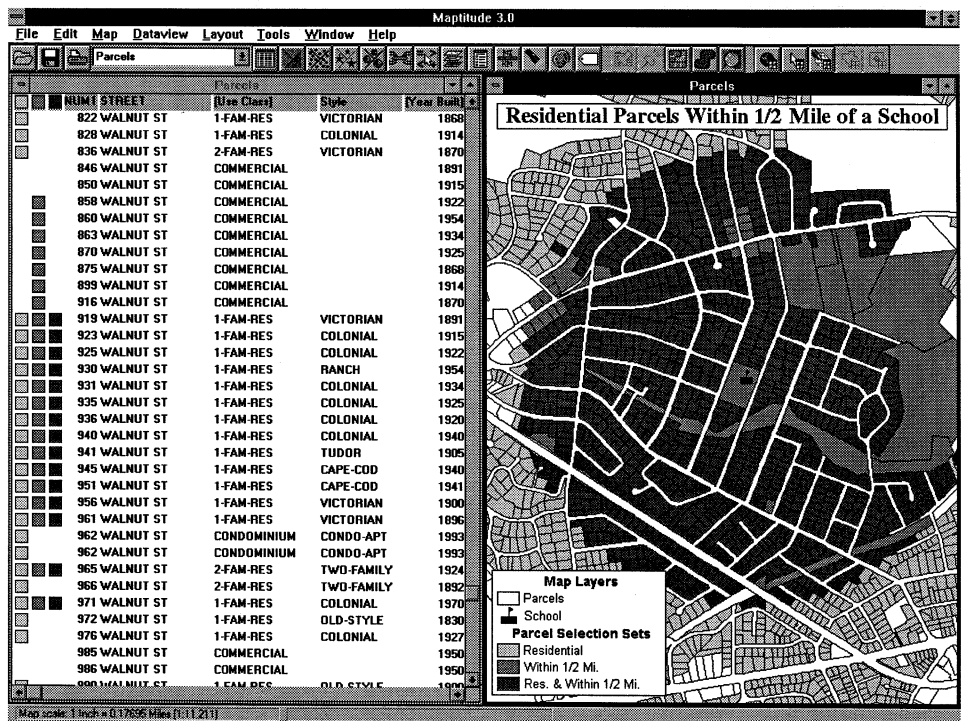
dataviews to your layout to describe selected map features.

Analytic Capabilities

MAPTITUDE offers a dazzling array of advanced spatial analysis functions, including feature buffering, districting, overlays, and routing.

MAPTITUDE has feature buffering technology that is without precedent in terms of functionality and performance. Buffers, or bands, are area features that are created at user defined distances around one or more map features. MAPTITUDE is the only desktop GIS that creates multiple bands in a single pass. Simply select a set of features and enter the distance or distances to be used to create the bands. MAPTITUDE will create a new area layer containing the bands with astonishing speed. MAPTITUDE also produces data-driven bands, where the size of the band around each feature depends on data that go with the feature itself.

MAPTITUDE makes it easy to perform overlays, an essential tool for site selection applications. Overlays are used to calculate demographics and other statistics for any area on a map. For example, overlays can be used to determine the number of persons, average income, and demographic make-up of persons living within 5, 10, and 15 miles of a potential retail site. To do this, you would create bands around the potential site and then overlay the bands on a ZIP Code or census tract layer containing demographic characteristics.



MAPTITUDE determines the exact percentage of each ZIP Code or tract that is contained within each band, and makes the correct numeric calculation of results. Most other systems either include or exclude the entire ZIP Code or tract based on whether the centroid is inside or outside of the band, resulting in incorrect results.

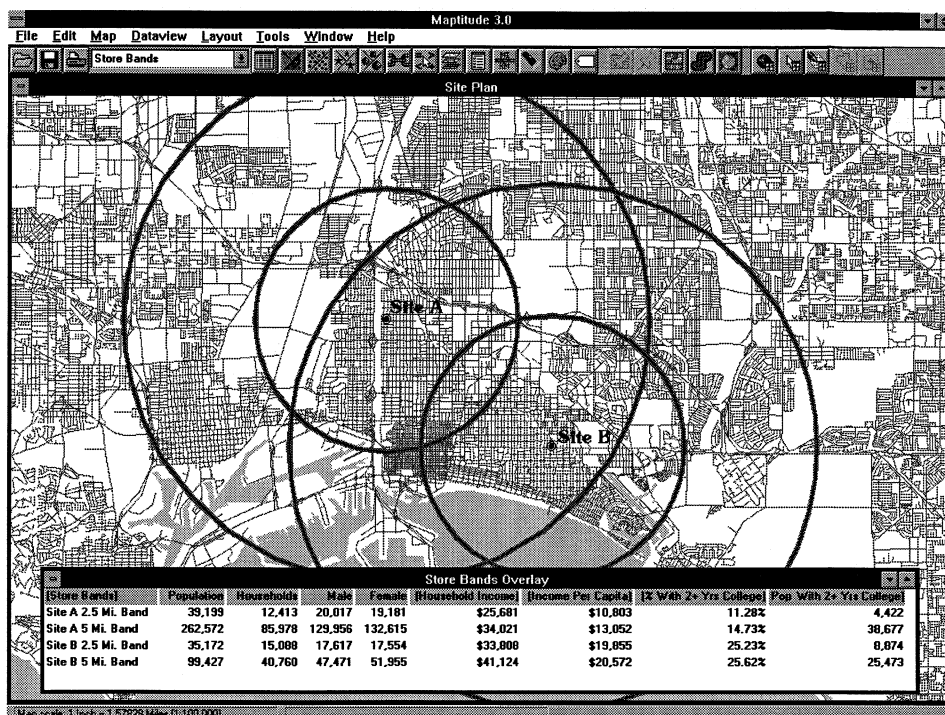
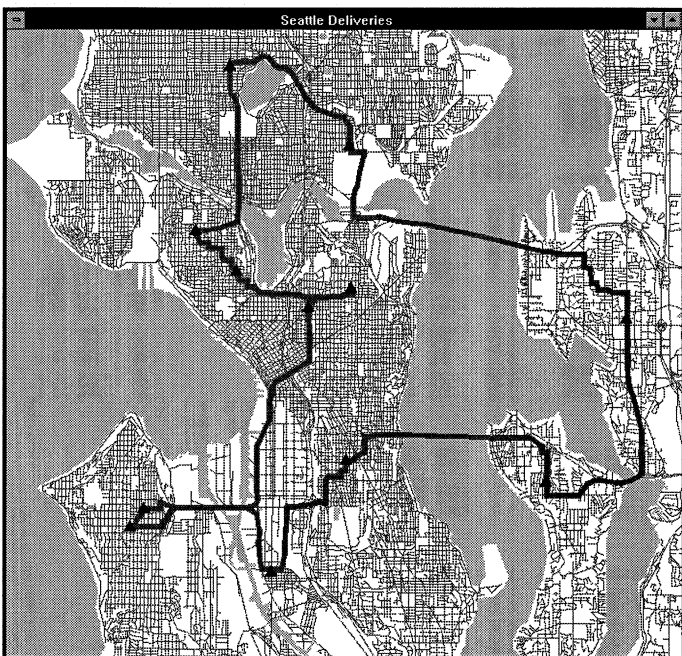
MAPTITUDE is the only full-featured desktop GIS product that includes routing capabilities. The analysis of networks has long been the strength of Caliper's high-end GIS products. Now, Caliper has brought some of this high-end technology to the business GIS market.

To perform routing, you place flags at the places you want to visit. MAPTITUDE will find the best route based on distance, time, or another measure. If you place three or more flags, MAPTITUDE can even find the best order in which to visit the points. The routes are displayed on the map, and the user can ask for complete driving directions. MAPTITUDE lets you route on any database, not just the ones that come with the software.

Caliper Corporation offers more elaborate solutions for truck routing and other specialized transportation in its TransCAD Transportation GIS Software package.

Creating and Maintaining Geographic Data Sets

MAPTITUDE provides a complete set of tools for creating and editing geographic files. Moreover, MAPTITUDE is the only



desktop GIS that stores and manipulates geographic data using a true topological data structure that supports many advanced analytic functions. This important capability avoids the serious data integrity problems that plague many other CAD and GIS packages.

MAPTITUDE stores data in two different formats. The geographic data on the MAPTITUDE CDs are delivered in a compact read-only format that packs a phenomenal amount of map data into a small space. This format was designed to let you make maps directly from CD, with little loss in performance. MAPTITUDE also supports

an editable format that lets you use geographic editing tools to add, update, and modify geographic features. Conversion between the two formats is easy.

You can edit geographic features using a mouse or digitizing tablet. While you edit, Caliper's unique Active Topology™ feature maintains the integrity of geographic data sets by ensuring that map features are properly connected without undershoots, overshoots, or sliver polygons. Because MAPTITUDE sup-

ports the use of aerial photos, satellite images, and other raster files as map layers, you can also perform "heads-up" digitizing.

Data Import and Export

MAPTITUDE provides more import and export options than any other package in its class. MAPTITUDE imports and exports AutoCAD DXF files, MapInfo MIF files, Strategic Mapping's BNA files, ARC/INFO ungenerate format files, and text files. MAPTITUDE also imports TIGER/Line files and ETAK MapBase files. All import and export capabilities are included in the \$395 purchase price.

Database Management

MAPTITUDE provides the most powerful relational database capabilities of any desktop GIS, with true virtual table handling and built-in ODBC support. Like most of the packages in this class, MAPTITUDE directly supports dBASE format files. MAPTITUDE also directly supports fixed-format text files, fixed-format binary files, and comma- or tab-delimited text files. Any of these types of files can be displayed in a dataview, joined together to form a virtual table, or joined with a map layer to make maps.

You can edit data in a dataview window just like any database manager or spreadsheet. Simply select the cell to be edited and type a new value. Assuming the cell is not write protected, the data value will be updated immediately. You can also fill columns or

highlighted ranges with data, and use formulas to calculate new values on the fly. MAPTITUDE also lets you define and create new data tables and use them to link information to map features. Convenient tools let you quickly populate the rows and columns of tables you create.

MAPTITUDE is the only desktop mapping package with true client-server connectivity. MAPTITUDE includes built-in ODBC driver support that lets you display and edit data stored in Oracle, DB2, Paradox, Ingres, Microsoft Access, Excel, and any other relational database management system that has an ODBC driver. Opening an ODBC table is as easy as opening a dBASE file — simply choose the ODBC source and table you want to see, and MAPTITUDE displays the data in a dataview. From there, you can either pin-map the data or join the data to an existing map layer, and you can make maps from any of the information in your database.

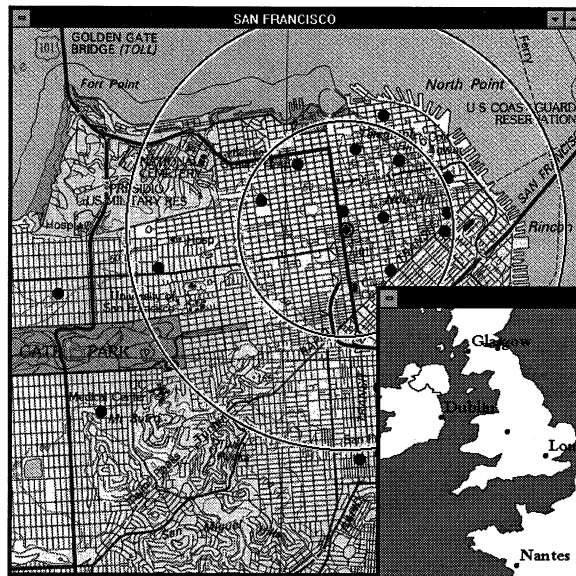
Other GIS packages, even those who claim to offer client-server connectivity, only offer a batch-mode query capability (usually as an add-on product) that can be used to download information from a relational database into a dBASE file or some other format that the program can use directly. With MAPTITUDE, no downloading is required, and you do not need to make copies of your data to use them in your maps.

MAPTITUDE offers significant power in its ability to create and manipulate virtual tables. You can join any number of data sources together (including any type of table or ODBC source) into a single joined view, display and edit the data, create formula fields, make maps, perform queries, and more, working directly from the join. If you want, you can also create new tables from a joined view, which makes data display faster at the cost of the live database link.

To the best of our knowledge, MAPTITUDE is the only desktop GIS that lets you edit and update data in a relational DBMS using ODBC. If you do not already have the ODBC drivers you need, Caliper offers an ODBC driver pack containing drivers for most common databases for \$199. The ODBC pack contains drivers licensed by Caliper from Intersolv Q+E.

Pictures and Images

MAPTITUDE provides all kinds of support for the use of pictures and imagery. MAPTITUDE lets you use aerial photo-



graphs, scanned maps, and satellite images as layers in your maps. MAPTITUDE supports TIFF format image files, and provides superb support for U.S. Geological Survey digital orthophotos and SPOTView™ satellite images. With these two types of files, MAPTITUDE automatically registers the image with other layers in your map. All you need to do is open the file, and you are ready to go. This eliminates the frustrating exercise of manually entering and editing registration points before you can use the image.

MAPTITUDE is the only desktop GIS that has built-in tools for creating, editing, and displaying slide shows. Slides are Windows bitmap (.bmp) files, which can be from any source. MAPTITUDE can save any map, dataview, or layout as a bitmap file. You can link together any number of slides into a slide show, complete with titles and running times for each slide, and go one step further by linking any map feature to its own slide show. Clicking on the feature with the Info tool lets you view tabular data associated with the feature and run the slide show.

OLE 2.0 Support

MAPTITUDE is the only desktop GIS that supports OLE 2.0. MAPTITUDE acts a map server, letting you link or embed its elegant maps into Microsoft Word, Excel, Corel DRAW, and many other Windows products.

You can link and embed maps using the Windows clipboard, by inserting a MAPTITUDE Map object from the other application, or by using the MAPTITUDE OLE Drag and Drop tool. Once your map is linked or embedded in the other application, simply double-click on the map to launch MAPTITUDE. Then you can edit and update the map any way you like.

Ease of Use & Documentation

MAPTITUDE is astonishingly easy to learn and use. Anyone familiar with the Windows environment will have no trouble picking up MAPTITUDE and making things happen, including users who have never used desktop mapping or GIS before.

The MapWizard concept extends beyond mapping. In many instances the software will automatically do the right thing to accommodate novice users while providing experienced users with all of the flexibility to customize analyses and results. Users who are familiar with other mapping or GIS packages, many of which have been branded as being user hostile, will be amazed by how quickly they will make effective use of MAPTITUDE.

The clean design and ease of use of MAPTITUDE is exemplified by the documentation. The basic GIS concepts and user

interface are documented using simple language and eye-catching graphics. Compared to their competition, Caliper has produced a document that is a pleasure to look at. The User's Guide really encourages you to use it, and to explore a range of software functions.

Tutorials are used effectively throughout the documentation. The GIS data model and basic software functions are introduced through an effective Quick Start tutorial. In addition, each chapter is task oriented and contains one or more 60-Second tutorials that lead you through a specific software function, and help you make effective use of the software in record time. The documentation is so good that many businesses and schools will want to get MAPTITUDE to teach employees and students about GIS.

MAPTITUDE includes a complete and well-organized Windows on-line help system. You can also get pop-up help on any tool or button simply by letting the cursor rest on it for a moment or two.

Caliper Corporation provides free technical support for MAPTITUDE in four different ways: FAX, BBS, e-mail, and telephone. Caliper support staff and consultants are well-versed in GIS applications and offer a level of support that is unmatched in the industry.

Performance

MAPTITUDE is very fast, especially on large data sets. Every process, from displaying a map to solving a complex routing problem, is executed with remarkable speed, and anyone who is used to other GIS packages will be left wondering how MAPTITUDE can run so fast. The answer is simple: superior software technology. Caliper Corporation has been developing high-end PC-based GIS solutions for the last decade, and has clearly mastered the software engineering technology necessary to quickly and efficiently execute complex applications on a PC platform. Compared to the competition, MAPTITUDE is a clear winner.

Geographic Data

Even with its low \$395 price, MAPTITUDE includes a phenomenal amount of geographic and demographic data, delivered on three CDs. MAPTITUDE lets you use the data directly from the CD, or you can load all or part of the data onto a hard disk or file server, and watch the software fly!

Caliper provides the following data sets for the entire US:

- the Caliper Streets file
- boundaries and over 600 demographic items for ZIP Code areas, census tracts, counties, states, MSAs, and census designated places
- boundaries for ADIs and DMAs
- names, locations, and other data for 1,000 large cities, 42,600 ZIP Code centroids, 150,000 populated places, and 538,000 points of interest
- Over 420,000 miles of highways, 45,000 miles of Interstate highways, and 370,000 miles of railroads
- A coastal and inland water block file

MAPTITUDE also includes the following world data files:

- Country boundaries with demographic and economic statistics
- Names and locations of over 90,000 cities
- Over 4,750,000 miles of roads and highways and 800,000 miles of railroads

When you register your copy of MAPTITUDE, you receive a third, bonus CD containing scanned, registered maps in TIFF format for most of the major metropolitan areas in the US, plus additional data sets that are added from time to time.

Caliper is also a reseller of a variety of third party data products which are available for MAPTITUDE.

MAPTITUDE Versus the Competition

The strengths of MAPTITUDE are numerous. First and foremost, the software is beautifully designed, clearly documented, and easy to understand and use. There is no better way to get into GIS and mapping technology.

Second, MAPTITUDE offers the richest feature and function set of any Windows mapping software. MapWizard thematic mapping, TrueType font symbol libraries, automated labeling, fully-scalable line styles, 3-D pie and bar charts, and a host of other user conveniences result in the best maps that can be produced on the desktop. Routing, overlay, multi-band buffering, and topological editing bring high-end technology and capabilities in a form that anyone can use.

Caliper's unique data compression technology for geographic data deserves particular mention. It results in the delivery of more

data and faster maps, in less space. The ability to geocode nationwide from a single CD is worth the price alone.

Taken together, these capabilities give you great flexibility in visualizing data and generating informative maps, using your own data and the many geographic data sets that are packaged with the software. As shown in the comparison table, MAPTITUDE dominates the competition, offering far more functionality at a far lower cost.

The limitations of MAPTITUDE are few and hard to find. The software does not currently support an interface to Global Positioning System (GPS) receivers, although this function is currently under development and will be shipped as an add-in later this year. Similarly, the GIS Development Kit (GISDK) that will support the creation of custom interfaces and development of custom applications will also be available later in 1995.

MapInfo 3.0

MapInfo comes closest to MAPTITUDE in terms of overall functionality. It offers a good range of mapping options, many basic spatial query and analysis functions, and a nice variety of drawing tools for enhancing your maps.

However, MapInfo falls short in several important ways. The MapInfo user interface is clumsy, and requires the user to wade through numerous, complex dialog boxes to perform even simple operations. MapInfo's SQL add-on lets you perform batch queries to download information from an external database, but there is no way to create a live link to an external database. MapInfo provides generally good support for Windows, but does not yet support OLE 2.0. Because MapInfo is a desktop mapping package and not a GIS, it lacks the advanced analysis tools, topological data management functions, and snappy performance of MAPTITUDE.

We found it alarming that some MapInfo functions are plagued by significant numerical inaccuracies. For example, a county level dot-density map of the US that uses 1 dot for every million persons displays only 38 dots, rather than the 241 that should be displayed. This error alone is serious enough to make one think twice about using MapInfo for any business application.

MapInfo costs \$1,295, roughly three times the price of MAPTITUDE, not counting the add-ons for SQL connectivity (\$595) and

ARC/INFO translation (\$595). MapInfo provides a very limited amount of data with the package, and the prices for additional data are an outrageous rip-off. MapInfo charges more than \$40,000 for data files that are included free with MAPTITUDE.

Atlas GIS

Atlas GIS (\$495) provides substantial GIS functionality at a fraction of the price of MapInfo. Atlas GIS uses a page metaphor, so that your screen always shows you how the map will look in printed form. You can enhance the map using drawing tools and up to three insets per map. Atlas GIS also provides flexible data manipulation capabilities for the small number of tabular formats that it supports.

Atlas GIS has fewer types of thematic maps than MAPTITUDE and MapInfo. For example, it cannot display pie or bar charts as part of a map. Atlas GIS is the only desktop GIS product that limits you to only one map window at a time. Its dialog boxes are unwieldy and difficult to navigate. The number of steps to do something in Atlas GIS can be overwhelming, compared to the MapWizard-ry of MAPTITUDE. While the Atlas GIS page metaphor is often convenient, it is frequently constraining. Atlas is easier to use and has better documentation than MapInfo, but it does not compare favorably along either dimension with MAPTITUDE.

An impressive catalog of data is available for Atlas GIS but, like MapInfo, Atlas GIS

data prices are scandalously high. Atlas GIS is supplied with a CD that contains nationwide ZIP+4 data for geocoding, but you cannot access the data without paying a whopping \$9,000 in additional license fees. The same CD contains information that can be used for street level geocoding, but you must pay an additional \$7,500 to make use of this information. If you want to actually display the streets in your maps, you have to purchase an additional 6 CDs with a price tag of \$5,500. Census tract boundaries will set you back another \$5,000, and tract-level demographic data start at \$1,995 for a basic set of 70 variables.

If MAPTITUDE didn't exist, there might be a niche for Atlas GIS. Try as we might, we can't see why anyone would consider Atlas GIS now.

ArcView 2.0

ArcView 2.0 is the latest entry into the desktop mapping market by the Environmental Systems Research Institute (ESRI). Despite an elongated development process and many millions of dollars spent on software development, ArcView 2.0 has failed to meet user expectations and has done little to bury the tarnished reputation of the buggy and incomplete first version.

ArcView was designed largely to provide viewing capability for geographic data sets created and maintained by users of ARC/INFO, ESRI's flagship product. ARC/INFO is a workstation-based GIS that requires sig-

nificant investments in time and money to develop databases and execute effective applications. Because it was designed as a data viewer, ArcView provides no direct way of creating or updating ARC/INFO geographic files. On the other hand, if you have access to ARC/INFO geographic data, ArcView will provide some basic geographic query and display functions. To get the most out of ArcView, you need to have an ARC/INFO workstation and ARC/INFO software.

ArcView's terminology and user interface are very confusing. For example, ArcView calls a layer a "theme", a map a "view", and a theme a "legend." Because it was developed using multi-platform tools, ArcView does not look and feel like most Windows applications. Functions are accessed through a user interface that is neither intuitive nor attractive, and basic operations such as displaying a map or adding labels to a map are painstakingly slow. The ArcView manual is wildly incomplete, and contains so many references to the on-line help system that one wonders why they bothered to include the manual at all.

ArcView 2.0 has a retail price of \$995, without any street files or census demographic data. Additional data and boundary files are sold in ARC/INFO format by third parties. For the typical desktop mapping user, ArcView 2.0 is not a serious alternative and cannot be considered as a stand-alone mapping solution. ■