

MAPTITUDE  
A LOW COST GIS/DESKTOP MAPPING ALTERNATIVE

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**ABSTRACT**

The South Carolina Forestry Commission has been looking for a low cost desktop mapping application for use by its field foresters in preparing forest stewardship and other forest management plans. After several years of looking at what was available, the Commission selected a product from Caliper Corporation called Maptitude® -- a Geographic Information System for Windows. Maptitude® cost 1/3 to 1/4 as much as some of the more popular GIS programs, includes more geographic data, has a smoother interface, and a routing module. Maptitude® can be interfaced with GPS units, import a wide variety of raster (image) formats, import other GIS and CAD application formats, and includes an extensive street database layer. All GIS applications have a steep learning curve, but Maptitude® is a relatively easy-to-use package through the use of Create-a-Map Wizard™, drawing tools and other features. Maptitude® can read Excel spreadsheets, dBASE files, text files, and any ODBC compliant data source to link data in a table to map features or locations. As an independent reviewer noted “Maptitude...delivers high-end GIS steak at hamburger prices.” (Simon, 1997).

**INTRODUCTION**

The South Carolina Forestry Commission began looking at Geographic Information Systems (GIS) as early as 1987 with a product for Burroughs (now Unisys) computer systems. The cost in hardware and software for this system was well over \$100,000. And this didn't include any data or maps. Over the next few years the Forestry Commission looked at products for Macintosh and DOS computers including Arc/Info and MapInfo.

The Forestry Commission selected in 1990 for uses on its state forests MapInfo for DOS over other products as a GIS platform due to its lower cost and shorter learning curve. Historically, the state forests serve as training grounds for new foresters and have a high turnover

in personnel. MapInfo appeared to be an easier program to learn with its menu driven interface. This improved greatly as the program migrated to the Windows platform and graphical user interface.

With the Windows graphical user interface, programs became easier for the end user to use. Windows programs began using the same menu and toolbar button structure that was commonplace on Macintosh computers. Once a user learned how to open, save and print files in one Windows program, that knowledge was easily transferred to other Windows programs. The learning curve for new programs that utilized the Windows GUI dropped drastically. A new user could concentrate their time on unique features and functions of the new programs instead of the basics. Gone was the need to learn a special command language and typing in strings of commands and settings to accomplish even simple things.

The increase performance and falling cost of computers and software began to make it feasible for field foresters to have desktop mapping and GIS programs. As the market increased for desktop mapping and GIS applications, new products emerged that rival their high-priced counterparts for average mapping tasks. One such product that caught the eye of the Forestry Commission in 1995 was Maptitude by Caliper Corporation. With the release of version 4.1 in 1999, Maptitude has matured into a good, general purpose, full-featured desktop mapping and GIS software program at a list price of \$395.00. This is about a third of the cost of ESRI's ArcView and MapInfo Corporation's MapInfo Professional which are the market leading GIS applications.

Maptitude 4.1 is an excellent choice for individuals exploring the benefits of a desktop mapping/GIS application because it rivals the high-end applications at a fraction of their cost. Its map creation tools are easier to use than ArcView and offers page layout tools similar to and as easy to use as MapInfo Professional and ArcView. Maptitude 4.1 includes a "Create-a-Map Wizard" that steps you through the process of making a map at any scale. Or you can go to its Map Librarian and select one of the many pre-designed maps of demographic data.

The User's Guide for Maptitude 4.1 is easier to use for beginners and includes tutorial exercises covering major program features. Maptitude 4.1 includes a contour and routing module (and creates driving directions) that are not standard equipment with ArcView and MapInfo Professional. Maptitude 4.1 also comes with a full set of mapping data for the U.S. (see Table 1) and the World to help you start mapping right away.

Table 1. Some of the U.S. Data included with Maptitude 4.1

High Resolution County Boundaries	High Resolution State Boundaries
Low Resolution County Boundaries	Medium Resolution State Boundaries
U.S. Streets 1998	Low Resolution State Boundaries
U.S. Interstates	Point Landmarks
U.S. Highways	Landmark Boundaries
Railroads	Cities & State Capitals
Water Features	Census Tract Boundaries
5, 10, 20 and 30 Degree Grids	5-Minute Digital Elevation Model

Another plus with Maptitude 4.1 is its ability to import a large range of data from other applications. It can directly read data from Excel spreadsheets, dBASE files, and text files. Using open database connectivity (ODBC), it can read ODBC compliant data sources like Access, Informix, Oracle, Paradox, and SQL Server, just to name a few. It includes translators to import geographic data from other GIS and CAD applications, common government file, and raster (image) formats (see Table 2). It can also export your Maptitude 4.1 data to other major GIS and CAD applications. A GPS unit can be connected to a laptop PC running Maptitude 4.1 to track your location and build geographic databases in the field.

Table 2. Listing of data formats supported by Maptitude 4.1 (\* indicates formats Maptitude 4.1 can export to).

Arc/Info Ungenerate and Export (E00) files*	US Census Bureau TIGER/Line files
ArcView Shapefiles*	USGS Digital Elevation Model (DEM) files
AutoCAD DXF files*	USGS Digital Line Graph (DLG) files
ETAK MapBase files	USGS Land Use & Land Cover (LULC) files
Integrgraph Design (DGN) files	Defense Mapping Agency Interim Terrain Data (ITD) files
MapInfo Interchange Format (MIF) files*	Defense Mapping Agency Vector Product Format (VPF) files
Text files*	Ordnance Survey NTF files
SPOT Image (BIL, TIF) files	Stategic Mapping BNA files
Tagged Image Format (TIF) files	National Transportation Atlas Dataset (NTAD) files
GeoTIFF Image files	Digital Orthophoto (DOQ/DOQQ)

Digital ortho quarter quad (DOQQ) photos were recently completed for South Carolina and available for other states. These digitized, ortho-corrected, geo-referenced, aerial photos provide an excellent base map for GIS applications. Maptitude 4.1 can import these DOQQs and utilize the geo-referenced data to correctly place it on the “earth”. Heads-up digitizing can then be utilized to create forest management maps. Scale can be changed on the fly to show more detail for stand delineation or mapping other features. Since this data is geo-referenced, reasonably accurate measurements can be made such as acreage and distances.

Maptitude 4.1 can import geographic data on soils, topography, transportation, hydrology, etc. and overlay them to provide additional information about the property. Maptitude 4.1 includes over 300 symbols that can add to the readability of your map. The final map can then be placed in a page layout to include additional information such as legends, north arrows, timber type summary tables, charts, etc. to produce a final high quality map.

GIS applications are not easy programs to use. You are not only having to learning the application terminology but GIS terminology and concepts as well. To complicate things even more, terminology may be different between GIS applications. What is a coordinate system? What are projections and datums? Which should I use? What happens if I pick the wrong one? What is the difference between a layer in Maptitude and a theme in ArcView?

As you can see by the number of tools, buttons, and toolboxes available in Maptitude 4.1 (see Figure 1) and in any other full-feature GIS application, a user can easily get overwhelmed. The Forestry Commission’s major use for Maptitude 4.1 by its field forester is to improve the quality of forest management maps uses in plans developed under its landowner assistance

programs. To help foresters to begin utilizing the power of desktop mapping and GIS, a “How to” or “Step by Step” manual is being generated to simplify the map creation process. As new and better ways are found to perform the various steps to create a map, the manual will be updated. As foresters begin to utilize other features of Maptitude 4.1 and obtain more geographic data sets, the manual will be expanded to include information on how to use those items.

Figure 1.Quick Reference Guide to the Maptitude Tools and Buttons.

Quick Reference Guide to the MAPTITUDE Tools and Buttons			
Toolbar Buttons		Main Toolbox	
	New File		Dataview Fields
	Open File		Formula Field
	Save File		Sort Dataview
	Print		Hide Columns
	New Dataview		Lock Columns
	New Chart		Dataview Settings
	Color Theme		Column Settings
	Dot Density Theme		Reduce Width
	Scaled Symbol Theme		Increase Width
	Chart Theme		Add Record
	Join Dataviews		Delete Record
	Select by Condition		Compute Statistics
	Map Layers		Modify Table
	Show/Hide Legend		Layout Settings
	Map Scale		Layout Options
	Find		Duplicate
	Layer Style		Pull to Front
	Automatic Labels		Push to Back
	Locate by Address		Align Left Edge
	Locate by Value		Center Left to Right
	Merge by Value		Align Right Edge
	Create Bands		Align Top Edge
	Overlay		Center Top to Bottom
	Main Toolbox		Align Bottom Edge
	Selection Toolbox		Center Across Layout
	Map Editing Toolbox		Center Top to Bottom on Layout
	Routing Toolbox		Arrange Across Layout
	Image Toolbox		Arrange Top to Bottom on Layout
<b>Selection Toolbox</b>		<b>Map Editing Toolbox</b>	
	Create New Selection Set		Modify
	Zoom to a Selection Set		Add
	Selection Settings		Delete
			Join
		<b>Routing Toolbox</b>	
			Add Stop
			Add Stops by Address
			Add Stop from Selection
			Find Route
			Clear Stops & Routes
		<b>Image Toolbox</b>	
			Add Control Point
			Delete Control Point
			Move Control Point
			True Location
		<b>Contour Toolbox</b>	
			Calculate Spot Data
			Create a Visibility Map
			Show Profile
			Change Contour Settings

## CONCLUSIONS

Maptitude 4.1 is a full-feature GIS application that can co-exist with higher-end GIS and CAD applications. With an initial investment of \$400, consulting foresters and landowners can easily afford to explore the benefits of GIS in their daily operations. It has powerful tools that make map creation easy. With its ability to import and export data in formats used by higher-end applications, Maptitude 4.1 provides an easy path for data or application migration.

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