

Autodesk Map 5

Robert Barr reviews Autodesk Map 5, a product that is designed to bring all the power of topologically structured geographic data and the added value of the results of standard spatial analysis operations to a mainstream CAD environment.

Autodesk is unlike any other company in the GIS business. As one of the largest suppliers of personal computer software and the dominant supplier of design software for PCs, Autodesk does not conform to the more usual industry model of companies that specialise in GIS. Perhaps the closest comparison is with Intergraph, another company with a background in Computer Aided Drafting and Design software (CAD or CADD); however, historically the two

companies have pursued very different paths. Autodesk has always capitalised on its dominance of the PC CAD market, its very strong international dealer network and its large installed base. Autodesk products are used for design by over four million users in 160 countries.

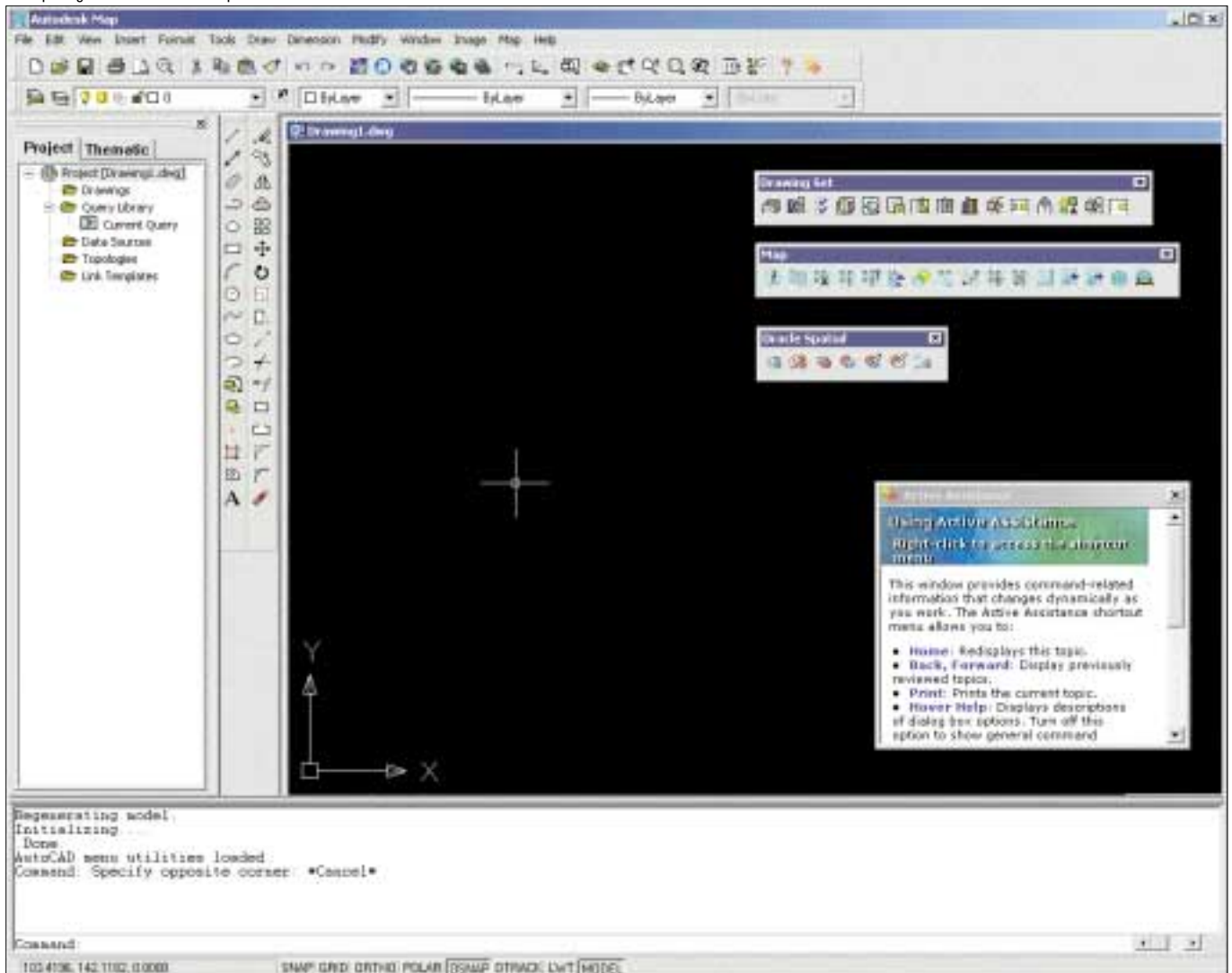
Under the leadership of the charismatic chairman, president, and chief executive, Carol Bartz, Autodesk has diversified its product lines and more than tripled its turnover.

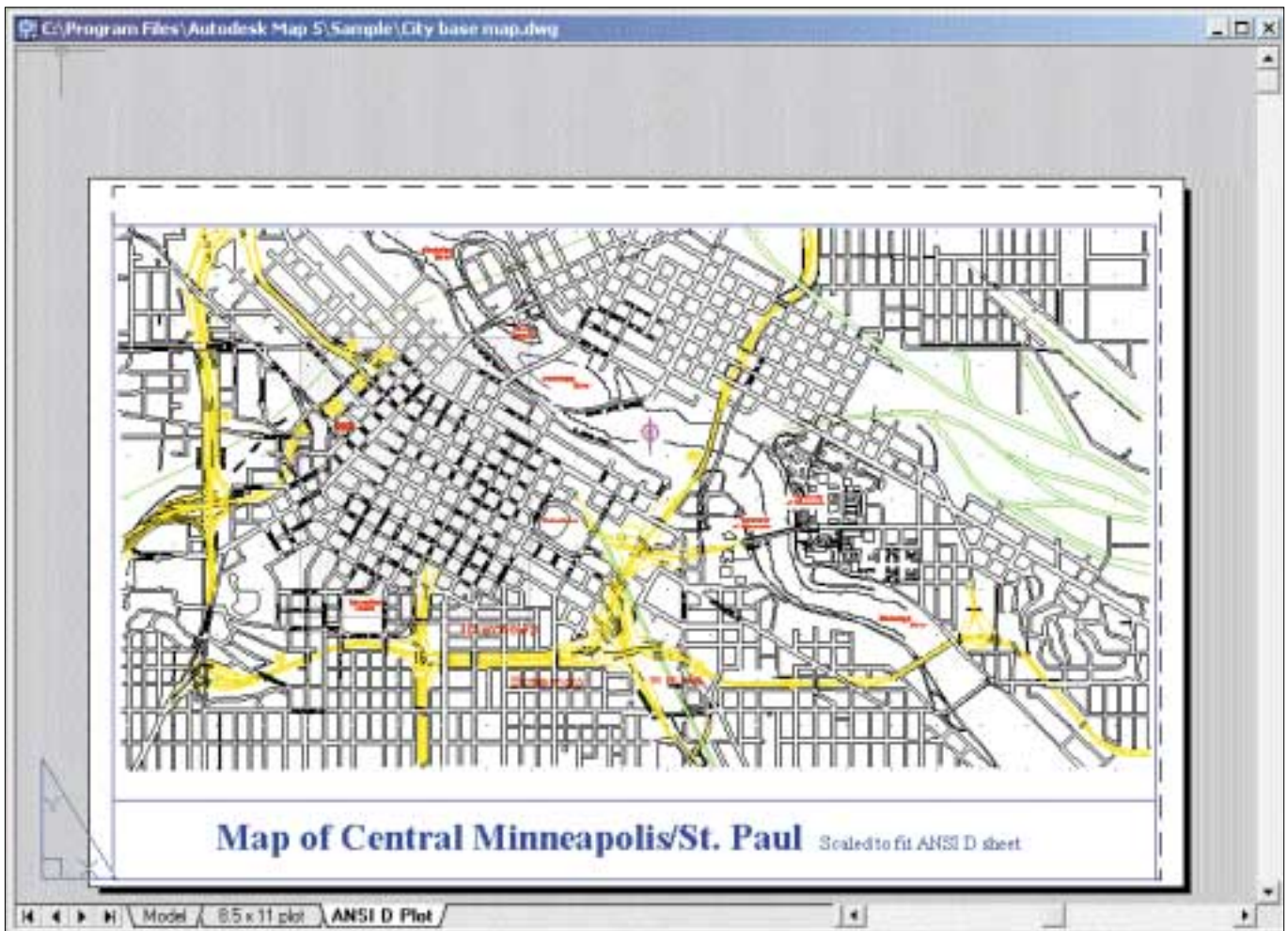
This has involved moves into a number of CAD-related markets, including 3D visualisation, multimedia, and engineering; in fact, any area that involves the production, sharing or dissemination of design-related information.

This led, some six or seven years ago, to the establishment of a GIS division. The rationale behind this was the fact that there is a very close relationship between CAD and cartography. Autodesk estimated that some 80 per cent

of digital cartographic products were produced, held or disseminated in Autodesk's AutoCAD DWG drawing file format rather than in proprietary GIS formats. This is not entirely surprising as architects, engineers and facility managers are all likely to see a map as a drawing, or a background to a drawing, rather than data for geographic analysis. Autodesk had already explored these waters by an earlier alliance with ESRI, but the size of the market and the

The opening screen of Autodesk Map 5





The layout window of Autodesk Map 5

extent to which they were already involved, somewhat inadvertently, prompted a major move into GI.

Autodesk's attack was three pronged. Autodesk Map (formerly AutoCAD Map) became the core product in the GI portfolio. This comprised a series of extensions to the main AutoCAD product to handle the requirements of geographic information. A well regarded South African product, ReGIS, was acquired and became the basis of Autodesk's full-strength GIS offering, Autodesk World. An innovative vector mapping extension to standard Internet browsers, with associated server software, MapGuide, was also acquired, developed and spearheaded the company's distributed GIS efforts.

Armed with three substantial products, and after having assembled a world-class marketing team, Autodesk came from nowhere in the GIS business and became a serious

competitor to the existing 'big three': ESRI, MapInfo and Intergraph. Of course, the view in Autodesk may well have been different; it probably regarded itself as a sleeping giant in GIS given that, by its calculations, most map-based geographic information was already handled using its CAD

databases linked to CAD systems. However, they were not mainstream GIS dealers. The user base came largely from the utilities, civil and highway engineers and architects. The GIS division also began to focus on the demands of the telecommunications industry,

middleware to link Oracle databases holding spatial data to Autodesk Map and MapGuide on a wide variety of platforms, from PCs to PDAs (personal digital assistants). Autodesk's GI marketing effort has also been directed recently towards the demands of the location-based services (LBS) market.

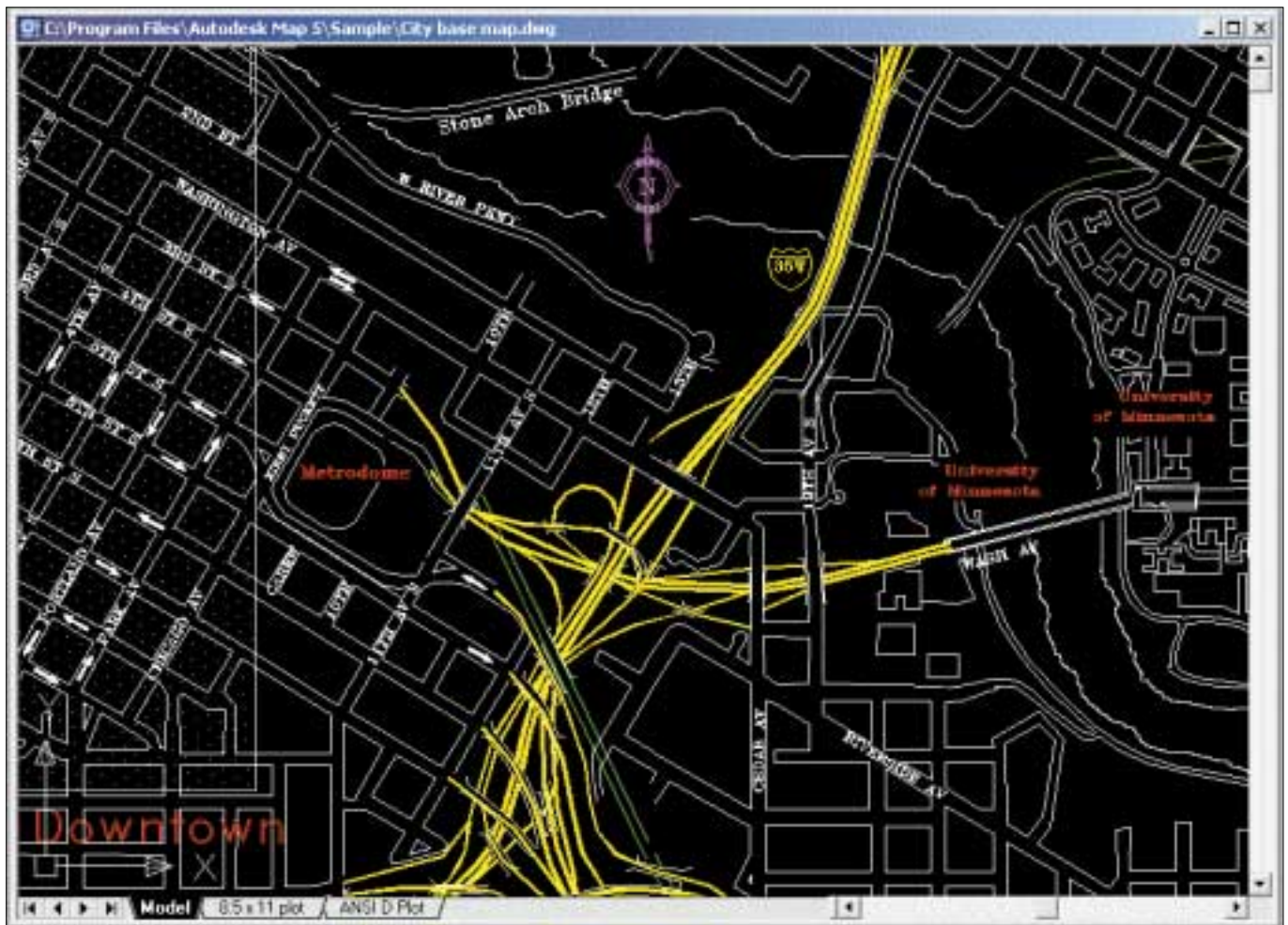
MapGuide (soon to be reviewed in *GI News*) provides the capability to distribute geographic information over the Internet or intranets, using a small and simple browser extension which allows vector graphics (which place much less demand on network bandwidth) to be distributed to any network-connected device, including wireless devices. The three products – Autodesk Map as a design and data maintenance product, GIS Design Server as a multi-user central repository for geographic information, and MapGuide as a flexible and versatile lightweight client for displaying and exchanging

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products and was in its own proprietary format.

Over time it became clear that, while it was an impressive product, Autodesk World did not fit well in the portfolio of Autodesk's products. The dealer base had great expertise in CAD, engineering and, increasingly, in maintaining

which had similar problems to the traditional infrastructure builders and managers that Autodesk served. Autodesk World was discreetly dropped while greater analytical capabilities were built into Autodesk Map. Development efforts were concentrated on the GIS Design Server,



The model window of Autodesk Map 5

geographic information – reflect a well thought through GI strategy.

Relationship between CAD and GIS

Historically, CAD and GIS share the same origins in the early days of computer graphics. In the 1970s it was so remarkable that a computer could produce an image at all that a simple set of vector graphics capabilities served many different purposes. In the early 1980s, personal computers liberalised and democratised access to quite sophisticated graphics capabilities. This was the market niche that AutoCAD, Autodesk's principal product, exploited, and it was a market that pre-dated the availability of any reliable, shrink-wrapped mapping software. In fact, I remember advising staff at a local authority at the time, which wanted to produce a simple census atlas, to buy AutoCAD rather than the very clunky mapping software that

was an alternative. The trade-off was between data management, which the mapping software did better, and flexibility of layout, design and display to produce a publishable set of maps, which was done better by the CAD software. The staff involved did not regret their choice.

Through the 1980s and into the early 1990s, CAD and GIS diverged. CAD moved towards rendering ever more realistic images, approaching photographic quality; GIS provided ever more sophisticated data management and spatial analysis capabilities, but was less good at producing attractive output.

However, later in the 1990s the two types of software began to converge again. GIS software started to include better image-handling facilities to integrate satellite and other imagery. Layout and pre-press production capabilities improved enormously. The CAD sector had by this time reached a remarkable degree of

pro prowess in producing near photo-realistic images, but had also realised the power of including very close links to databases and industry-specific analytical capabilities into the CAD environment. This re-convergence of GIS and CAD set the scene for Autodesk to enter the GIS market.

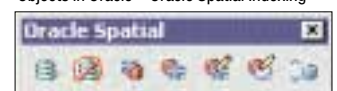
Autodesk Map

During its very rapid period of expansion in the 1990s Autodesk never lost sight of its core market. The emphasis was not just on CAD as a drafting and visualising environment but on 'D' for design. In its latest marketing stance Autodesk emphasises the integrating power of its software in the whole process of design. Autodesk solutions are available across many sectors, from the core architectural market through engineering, multimedia and facilities management. However, there is a common philosophy throughout. That philosophy is that the design of

any 'real world' object and its subsequent production and maintenance requires a good workbench environment, in which the initial design is produced with a range of data sharing and exchange tools available for collaborative working across local or wide area networks, and that this should be based on common data stores and the ability to serve the design to any type of client from the desktop to the mobile PDA. This philosophy links very well with the expansion of GIS capabilities into enterprise-wide solutions.

The nature of the Autodesk Map product is immediately apparent to any user as soon as they open the packaging. The documentation includes an 860-page manual for

Oracle Spatial Toolbar (from left): Connect to Oracle • Disconnect from Oracle • Export to Oracle • Import from Oracle • Update Selected Objects in Oracle • Update Erased Objects in Oracle • Oracle Spatial Indexing



AutoCAD 2002 and a 250-page manual for getting started with Autodesk Map. This is very clearly a CAD product with geographic extensions.

Once installed, using the simple installation routine, the product reinforces that impression. By the standards of current GIS software a relatively complex desktop appears (see figure on page 44). The screen is divided into three main areas. The usual Windows menu bar and a number of toolbars appear at the top of the screen. On the left there is a tabbed Explorer-style navigation window. The main part of the screen displays the current drawing file and serves as the designer's 'drawing board'. At the bottom of the screen, many experienced GIS users will appreciate, is a command line interface window for interacting with AutoCAD. Below that there is a series of context buttons and a coordinate tracking window.

Three floating toolbars and an innovative help facility complete the initial default environment. A 'Drawing Set' toolbar provides access to individual graphical objects, also providing a multi-user capability where the same drawing or map can be edited by a number of users simultaneously with conflict resolution taking place at the level of the individual graphic object. However, the real geographic power of Autodesk Map is revealed in the understated 'Map' toolbar. This includes access to the commands that extend the AutoCAD environment into the mainstream of geographic processing by providing heavy duty topological editing and spatial analysis capabilities (see above right for the commands available from the Map toolbar). This toolbar and the associated explanations in the Autodesk Map manual summarise and distil the very essence of geoprocessing in a succinct and accessible manner. The third toolbar again reflects the nature of the product. It provides access to Oracle Spatial, recognition that a GIS

tool for creating and maintaining geographic objects in a graphical environment needs good database support for high level applications.

The final floating element is an innovative help facility that is displayed as an Active Assistance window. This provides context-sensitive help about the function that is currently being used. This window both acknowledges the potential steepness of the learning curve for those new to AutoCAD and offers a very well thought through way of providing 'always available' help.

Autodesk Map, and its close integration with Autodesk's GIS Design Server, MapGuide and Oracle Spatial, has clearly defined Autodesk's niche in the GIS market. Interestingly, this 'niche' probably represents a large proportion of the overall spend in the GI marketplace.

The Autodesk Map environment may initially appear somewhat intimidating to the average GIS user. However, to take fright at that is to misunderstand the product; Autodesk Map is designed to bring all the power of topologically structured geographic data and the added value of the results of standard spatial analysis operations to a mainstream CAD environment. These additions are no longer just a token; all the structuring, querying and analytical capabilities that are commonly used in GIS have been included in Autodesk Map. AutoCAD dealers selling the Autodesk GIS line of products used to be perplexed by why there needed to be two products, Autodesk Map and Autodesk World. Their confusion has now been eliminated by providing full strength geoprocessing facilities in the AutoCAD environment.

Conclusion

Autodesk Map, and its close integration with Autodesk's GIS Design Server, MapGuide



Map Toolbar (from left): Drawing Cleanup • Boundary Break • Boundary Trim • Create Topology • Query Topology • Thematic Mapping • Overlay Topology • Buffer Topology • Shortest Path Trace • Flood Trace • Edit Topology • Plot Map Set • Import Map File • Export Map File • Assign Coordinate System • Geodetic distance

and Oracle Spatial, has clearly defined Autodesk's 'niche' in the GIS market. Interestingly, this niche probably represents a large proportion of the overall spend in the GI marketplace. The traditional automated mapping and facilities management markets are targeted with a ruthless degree of efficiency by Autodesk, rather than the broader (but in

market for additional geoprocessing capabilities. Autodesk has positioned itself well to meet these needs.

I recently visited a number of very impressive GIS data conversion companies in Hyderabad, India. It was notable as I went around their facilities, where almost every GIS product appeared on various workstations, that Autodesk Map and its AutoCAD base were often the products of choice for capturing and structuring geographic information. The Indian geographic data conversion industry thrives by offering high technology, high productivity and high value-added services in a carefully managed environment. It is interesting to see that software with a long CAD pedigree supports such enterprises well. Autodesk has made its mark on the GI industry by building from its core strengths to good effect. Autodesk Map is a tribute to that philosophy.

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cash terms probably smaller) markets for general GIS use. The telecommunications and utilities industries, and the emerging location-based services market, looking for mainstream heavy duty IT solutions for handling their geographic information, are well served by the Autodesk family of products. It is also likely that existing CAD users will continue to be a thriving

Autodesk Map 5 System Requirements	
Minimum	Pentium processor 233MHz
	Windows 98
	32 Mb RAM
	800 x 600 VGA with 256 colours
	Program Installation - 140Mb (63Mb swap space)
	System folder - 150Mb
	Shared files - 20Mb
Preferred	Pentium processor 450 MHz or faster Equivalent processor
	Windows NT 4.0 with Service Pack 5.0 or later, Windows Millennium Edition (ME), Windows 2000
	64 Mb RAM or higher
	1024 x 768 SVGA with 64,000 colours
	Program Installation - 140Mb (63Mb swap space)
	System folder - 170Mb
	Shared files - 20Mb