

Digital cartography

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The fields of computer-aided design and digital cartography have much in common: they are both concerned with spatial problems and are substantive applications of computer graphics. Digital cartography is the technology concerned with the construction and use of computer-based systems for the practice of cartography and its applications. One of the major applications of digital cartography is the fast-growing and commercially important field of geographical information systems (GIS). The aim of this special issue is to inform readers of *Computer-Aided Design* of the existence of digital cartography, to review its current capabilities, to point to the use of CAD systems in cartography, to explore common problems and solutions and to make explicit their fundamental differences.

Developments in information technology are extending the scope and modifying the character of digital cartography. In her introductory paper, **Visvalingam** provides a personal interpretation of established and emerging concerns within digital cartography and geographical information systems. **Newell and Sancha** provide a well-informed and engaging account of the differences between CAD and GIS. In their view, the most fundamental difference is that GIS models the world as it exists, whereas CAD models artifacts yet to be produced. They compare the two fields in terms of their technology, data, market, user applications and vendor organizations. **Shepherd** critically reviews the scope for mapping with desk-top CAD, which is increasingly used for a variety of mapping applications. He describes the benefits and limitations of using general-purpose CAD software within the specialism of digital cartography. He also outlines other contemporary developments which may divert attention away from CAD systems. **Hobbs and Chan** write about their personal experience with using AutoCAD as a cartographic training tool to support the Hong Kong Government's need to construct a computerised land information system. The map showing the climate of Hong Kong produced by one of their students, Vincent Choi Funshun, received the 'Highly Commended' category in the 1989 British Cartographic Society/Laser Scan Awards in Digital Cartography.

The established concerns of digital cartography

include the subfields of visual mapping, concerned with generation of graphic models of reality, and digital mapping, the technology concerned with the creation, management and performance of large integrated spatial databases. There is an increasing need within digital cartography to integrate data from different sources in both vector and raster formats. In their paper, **Annoni et al.** discuss the problems confronting the integration of remotely sensed images within a cartographic system, review some advances to-date and describe their own work on a hybrid cartographic system. Digital mapping is concerned with the design and population of large databases. The diversity of data sources and applications pose problems for managers of data. **Smith** discusses the conceptual and pragmatic considerations involved in defining appropriate spatial data models and data structures for use within multi-purpose databases, such as those held by the national mapping agencies.

A marketing strategy favoured by national mapping agencies involves the storage and distribution of reference data as digital maps and the on-demand production of pictorial maps based on current data to customer specifications. Automation of map production is thus attracting much attention. CAD and cartography sheer volume of cartographic data continues to be a problem. **Jones** reviews the strategies used for conflict resolution in cartographic name placement. From its beginnings, digital cartography has been concerned with the visualization of 3D data. The sheer volume of cartographic data continues to be a problem. Several workers have attempted to produce aesthetically pleasing displays from minimal descriptions of 2D data. **Falcidieno and Pienovi** describe their work on natural surface approximation by constrained stochastic interpolation which combines the advantages of techniques for both surface interpolation and fractal descriptions.

Digital cartography is an extensive field and it is not within the scope of this special issue to cover the breadth of the subject. This volume presents a sample of recent developments within digital cartography, which may be, or which may become, relevant to computer-aided design.