Chapter 1

THE CURRENT STATUS OF SPATIAL INFORMATION TECHNOLOGY

1. INTRODUCTION

In the world of information technology, it is fair to state that the only constants are change and growth. Judging from the developments in the field of spatial information technology in the last several years, this is definitely not an overstatement. Since the inception of the idea of using the computer for cartography and mapping in the 1950s, newer hardware and software tools have evolved to enable users of spatial information to operate more easily and extend constantly the frontiers of knowledge. New concepts of and techniques for using spatial information have paralleled the advances in hardware and software, and cumulatively these have accelerated the uptake of related information technologies.

The pervasive proliferation of spatial information during the past decade contrasts sharply with the earlier era, which prevailed until the early 1990s. This era was characterised by the umbrella term of geographic information systems (GIS) as a highly specialised technology of interest primarily to professional users and researchers for specific applications. One of the major driving forces behind the recent popularisation of spatial information is the increasing availability of spatial data from government and commercial sources, distributed via the Internet through such mechanisms as spatial data depots, digital geolibraries and spatial data warehouses and clearinghouses. Another major driving force is the growing awareness of the importance of spatial information by all sectors of modern society. Policy makers in the public sector, for example, have embraced the notion that spatial information is an important requirement of good governance, a fundamental aspect of the
economy, and access to this information is a civil right that enables citizens to participate in public affairs. At the same time, commercial organisations including hardware and software developers, data collectors and providers, and information service providers all see spatial information as a business opportunity bounded only by their vision. Users of spatial information are no longer limited to professionals and researchers, but include people who plan their travel itinerary using an on-line map service on the Internet, who check the weather conditions on a specialty television channel, who search for a new home in an on-line multiple listing service (MLS), and who access geographically referenced information about their communities, the environment, and national and international affairs on the World Wide Web.

The changes in the collection, management and use of spatial information noted above would probably not have happened, at least not to the extent that is evident, without the power of spatial databases. This book charts the use of spatial information by using a holistic data-based and user-centric approach instead of the conventional application-driven and GIS-centric approach. The approach embraces database development and management, data access policies and interchange, standards and metadata, commodification and liability of spatial data services, spatial knowledge discovery and decision support, all of which are addressed in the following chapters. From the perspective of training and education, this conceptualisation implies that the traditional approach, which viewed GIS in terms of data management, cartography and spatial analysis, must be broadened to accommodate the growing realisation of spatial information as an institutional resource, a commodity, and a knowledge base for decision making. In essence, this new view of spatial information was one of the main motivations for writing this book.

This introductory chapter seeks to provide a conceptual framework for the purpose, content and structure of the book. It first overviews recent advances in the concepts and technology of the new approach to spatial information. The knowledge and skills required to design, implement and manage a spatial database are discussed. The organisation of the book is then introduced by giving a brief description of each chapter and the threads that are unwound among individual chapters.

2. ADVANCES OF SPATIAL INFORMATION CONCEPTS AND TECHNOLOGY

The design and implementation of spatial information technology largely depends upon the trends that have characterised information technology (IT) in general. The concepts and techniques used in spatial database systems