Chapter 3.32
Geographic Information Systems Research and Data Centers

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ABSTRACT

The use of geographic information in a variety of research and educational endeavors has created a number of challenges involving data management and dissemination in support of educational processes. Academic libraries, using computing services and virtual libraries, have provided a framework for supporting the use of geographic information within academic communities. This chapter examines the development and implementation of a geographic information systems (GIS) research and data center within the digital environment of a "virtual library" in a large urban university. The chapter will also highlight specific organizational, design, and technical aspects of three exemplary digital geospatial centers, which served as the basis for creating a model GIS Center. In addition, federal data standards and issues for cataloguing geospatial data will be examined. The chapter concludes with a discussion of future issues and technological challenges for GIS research and data centers.

OVERVIEW OF GIS

Geographic information systems programs are more than tools for the production of maps. A GIS can store and manipulate geographic data for spatial analysis in a variety of environments, including urban planning, resource management, transportation networks, and public administration. In addition, GIS applications have been adapted to academic research as academicians find GIS a valuable tool for research grants and projects.

Designed for use on computer mainframes and written in languages such as UNIX, early GIS programs were organizationally complex and not intuitive to the average user. During the 1990s, technological developments in computer hardware and software provided impetus for the rapid growth in the field of GIS, from hardware configurations to the production of maps. A significant impact to the field was the introduction of desktop mapping software programs, such as Environmental Systems Research Institute's (ESRI) *PC Arc/Info*, Arcview, and MapInfo Corporation's *MapInfo* software series. These GIS software programs, designed for a Windows operating environment, broadened the scope of users of the programs and were designed for a variety of user skill levels.

THE DEVELOPMENT OF GIS

In 1990, the Geography Department at the University of South Florida (USF) began offering courses in GIS methods and techniques, using ESRI's desktop software, *ArcInfo*, and *ArcView.* The GIS classes explored the underlying spatial theories of GIS, environmental modeling, and socioeconomic trends in urban analysis. These classes also educated the initial group of GIS users on the USF campus, increasing the computer literacy and use of these programs by other faculty, staff, and students. Soon, GIS programs, data, and applications were being utilized by a number of academic disciplines (anthropology, biology, civil engineering, and geology) and in a number of research institutes (the Center for Urban Transportation and Research, the Florida Center for Community Design and Research, and the Louis de la Parte Florida Mental Health Institute). To facilitate access to products, USF procured a university-wide site license from ESRI for a suite of software applications. Faculty

began producing voluminous amounts of digital geospatial and other related data in a wide variety of subjects. The data was produced in a range of heterogeneous formats for research projects and for use within classrooms.

Through its Virtual Library, the USF Library System plays an important role in providing support to the university's increasingly networked computing community. The library system offers educational and research support through an online interface that leads the user to a variety of library services, accessibile to electronic databases, and the library catalog. The foundation of the online services and resources are the traditional library strengths of information collection, description, organization, and dissemination. The combination of the traditional and innovative strengths of the library system makes it well suited to support the educational and research needs of the GIS community at the University of South Florida.

By 1999, in response to the growing use of GIS, the Council of Deans adopted a proposal to investigate the feasibility of establishing a library-facilitated geographic information systems (GIS) research and data center. A year later, a task force, comprised of research and teaching faculty in conjunction with public and private sector GIS practitioners, determined that the main mission of a GIS Research and Data Center was data stewardship and management to support the University's GIS research needs as well as to serve as a bridge to external GIS communities (Reader, Chavez, Abresch, et al., 2000). To further define the primary functions of the Center, the Task Force Committee examined both Association of Research Libraries directives and the role of other libraries in the establishment of other regional spatial data centers.

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