Chapter 1 *History & Origins of GIS*

Objectives:

This chapter is meant to introduce you to the background of Geographic Information Systems. It was written by Jim Carrington of the Soil Conservation Service. It states the major points of the development of Geographic Information Systems in the U.S. and elsewhere.

After reading this chapter you should be able to:

1. Describe the basic functions of a GIS.

2. Give a date to the introduction of both manual and automated GIS's.

3. Name several of the GIS's developed by the U.S. government as well as Canada.

4. Name a few of the government agencies which use Geographic Information Systems.

History and Background of GIS:

GIS's are known today as systems that can collect, manage, manipulate, analyze and display spatial and attribute data. These systems are known today for the ability to take and work with many types of data, and draw conclusions through the analysis of many data layers. For example: show me the occurrences of highly erodible soils, less than fifty meters from perennial streams, with a 10% slope, that fall in Tarrant County, and on land that is publicly owned.

Some have estimated there are some 83,000 GIS's found throughout the country, in towns, cities, counties, states and federal agencies as well as private industry. There are at least 50 federal agencies using GIS technology today. A recent survey found at least 62 different GIS packages in existence. There are plenty of "home spun" college, governmental and private industry GIS packages as well.

The first usages of GIS's may have been with the Public Land Survey of 1785 (with a referenced geographic land system) and possibly with the beginnings of thematic cartography in the 1800's. In addition, the development of the computer punch card by Hollerith in 1890 fostered the growth of automated geo-processing.

The modern era of geographic information systems is attributed to the refinements of cartographic technique - like stable map base materials and color separation, as well as the growth of spatial analysis - through such work as Ian McHarg's "Design with Nature" and lastly through the rapid development of the computer - from main computing to powerful network computer workstations.

Computer cartography has allowed for:

a. maps being produced more quickly
b. maps being produced inexpensively
c. map production which was not possible before
d. maps designed for specific user needs
e. cartographic experimentation
f. facilitates analysis of spatial and attribute data
g. minimizes map as a data store
h. maps created that are impossible to produce manually
i. maps produced where the parameters can be defined
j. automation throughout the map making process
k. maps produced from digital data

Through the 60's and into the 70's much development and application of automated cartography was undertaken - most notable in the digitizing and plotting of data. As computers got cheaper and more efficient software was designed; two directions were established. The first being the continual automation of cartographic tasks with emphasis in cartographic accuracy and visual quality. And secondly, the beer methods for the analysis of spatial data were developed. The latter being such systems as STORET by the Public Health Service and the former being systems such as MIADS by the Forest Service.

The first GIS in modern time is generally acknowledged to be the Canada Geographic Information Systems (CGIS) in 1964. (See Appendix A for more information) Many other GIS's were developed later on, particularly by the federal government like MOSS by the Forest Service, ELAS by NASA and DIME by the Census Bureau. After public domain GIS's came about, commercial vendors took up interest in GIS. Among these were ESRI®[1] with ARC/INFO®[2] and Intergraph Corporation®[3] with MGE®[4]. These and others have been concerned with the positioning of data with respect to a known coordinate system, attribute information on the data and the data's spatial or topological relationship to other data - but do so in their own unique fashion.

GIS differ from computer graphics because graphics are concerned with what appears on the screen and manipulates that image. GIS uses the display as soft copy, in the manner of a computer print-out or plot. The graphic display serves as s by product of the GIS software.

Some of the professional societies that are involved with GIS include: AAG - Association of American Geographers, URISA - Urban & Regional Information Systems Association, ACSM - American Congress of Surveying and Mapping, ASPRS - American Society of Photogrammetry and Remote Sensing, and NCGA - National Computer Graphics Association.

Some of the federal agencies using GIS include: Census, USGS, Forest Service, BLM, Corps of Engineers, National Park Service, EPA, and DOD to name a few. Magazines are published by the above mentioned professional societies, and serve as very good

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sources of information. In addition, “GIS World” magazine and GIS college textbooks are extremely useful.