

GEOGRAPHIC INFORMATION SYSTEMS &
WEB PAGE DEVELOPMENT

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The Facilities Engineering and Architectural Branch is responsible for the design and maintenance of buildings, laboratories, and civil structures. In order to improve efficiency and quality, the FEAB has dedicated itself to establishing a data infrastructure based on Geographic Information Systems, GIS. The value of GIS was explained in an article dating back to 1980 entitled "Need for a Multipurpose Cadastre" which stated,

"There is a critical need for a better land-information system in the United States to improve land-conveyance procedures, furnish a basis for equitable taxation, and provide much-needed information for resource management and environmental planning."

Scientists and engineers both point to GIS as the solution. What is GIS? According to most text books, Geographic Information Systems is a class of software that stores, manages, and analyzes mapable features on, above, or below the surface of the earth. GIS software is basically database management software to the management of spatial data and information. Simply put, Geographic Information Systems manage, analyze, chart, graph, and map spatial information.

GIS can be broken down into two main categories, urban GIS and natural resource GIS. Further still, natural resource GIS can be broken down into six sub-categories, agriculture, forestry, wildlife, catchment management, archaeology, and geology/mining.

Agriculture GIS has several applications, such as agricultural capability analysis, land conservation, market analysis, or whole farming planning.

Forestry GIS can be used for timber assessment and management, harvest scheduling and planning, environmental impact assessment, and pest management.

GIS when used in wildlife applications enables the user to assess and manage habitats, identify and track endangered and rare species, and monitor impact assessment.

GIS can be used in catchment management operations also. It can display runoff and erosion modeling. It can aid in sedimentation and water quality studies and can help to evaluate alternative management methods.

GIS can even be beneficial in archaeology, helping to facilitate the mapping and prediction of prehistoric sites, establish site vandalism studies, and create site management studies.

Another way that Geographic Information Systems can be utilized is through the field of geology and mining. It can aid in oil, gas, and minerals exploration. It can also be activated for the purposes of geologic mapping and terrain analysis, open pit mine design and redamation, and geologic hazard mapping.

However, at NASA Glenn, Urban GIS is primarily used. But what are its applications? Urban GIS applications include the provision of utilities, management of storm water, location and allocation of critical resources such as hospitals, schools or fire stations, study of disease outbreak patterns, crime analysis, waste collection routing or hazardous waste transportation. An urban geographic information system must be capable of processing a variety of attribute information from many different sources in order to satisfy the data needs of the service delivery, management, and policy levels of government. My project, using GIS, involved underground management.

What are the advantages of GIS? Computerized information allows improvement in the efficiency of the process as well as improvement in the effectiveness of the organization as long as the computer is able to produce and process the needed information. Thus, by improving both efficiency and effectiveness, computer processing technology continues to add value to the computerized and stored information.

Another reason why computerized information is so valuable is because it can be shared with other functions within an organization if it is properly stored within a server, mainframe, or centralized computer system.

At the outset, I was given goals and expectations from my branch and from my mentor with regards to the further implementation of GIS. Those goals are as follows: (1) Continue the development of GIS for the underground structures. (2) Extract and export annotated data from

AutoCAD drawing files and construct a database (to serve as a prototype for future work). (3)
Examine existing underground record drawings to determine existing and non-existing underground tanks. Once this data was collected and analyzed, I set out on the task of creating a user-friendly database that could be assessed by all members of the branch. It was important that the database be built using programs that most employees already possess, ruling out most AutoCAD-based viewers. Therefore, I set out to create an Access database that translated onto the web using Internet Explorer as the foundation. After some programming, it was possible to view AutoCAD files and other GIS-related applications on Internet Explorer, while providing the user with a variety of editing commands and setting options.

I was also given the task of launching a divisional website using Macromedia Flash and other web-development programs.

In addition I had the privilege of working on various intern committees, including serving as a layout-editor for the LERCIP Newsletter. All of these experiences have added to the enjoyment of my work and have provided me with a solid foundation on which to build my future professional career.