Developing application system of forest information using digital photogrammetry and GIS

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Abstract: Recently in order to process forest official task more effectively and scientifically the previous of that which is focused on document and inventory, should be applied with the spatial information technology. Especially, the forest information remote sensing system has to be developed using digital photogrammetry and GIS.

In this study the forest information remote sensing system is implemented to manage forest resource and forest official effectively especially by constructing database of forest environment information and cadastral information, overlaying various thematic maps, and performing spatial analysis using GIS and aerial photograph.

For this, the attribute data and spatial data of aerial photograph, digital topography map, forest cadastral map, forest type map, forest use map should be reprocessed and stored in Oracle. Also, the user interface is developed by using Visual Basic 6.0 and MapObjects 2.1 of ESRI based on CBD(Component Based Development).

Keywords: Aerial photograph, forest information, forest type map, forest cadastral map, GIS, Remote sensing, CBD (Component Based Development**)**

1. Introduction

In this study the forest information application system was implemented by constructing various spatial database such as aerial photograph, digital topography map, forest cadastral map, forest type map, forest use map, forest field register, and forest type map through using the digital photogrammetry, GIS, and RS. This system could be the foundation of the efficient and flexible domestic forest affair by avoiding the obsolete way based on old paper files and inventories. In addition, this system is expected to perform the domestic intelligent forest affairs by constructing the concrete forest data, processing the information comprehensively, and acquiring the result of high accurate analysis.

2. Constructing forest database and processing forest information

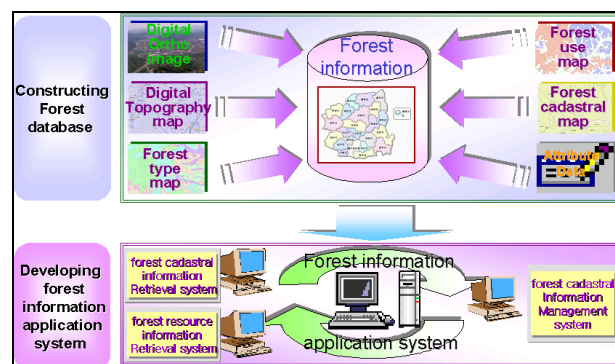In order to establish forest resource information re- pository, scanning aerial photographs based on 1:15,000 scale was first performed and then the digital thematic maps were classified depending on its use desires. Then the forest cadastral maps, forest inventories, forest type maps, and forest use map were constructed and stored in a repository.

Fig. 1 shows the entire concept diagram of forest information application system and Fig. 2 presents the each step to develop forest information application system such as image editing, image processing, file conversion into digital thematic maps, user interface implementation and so on.

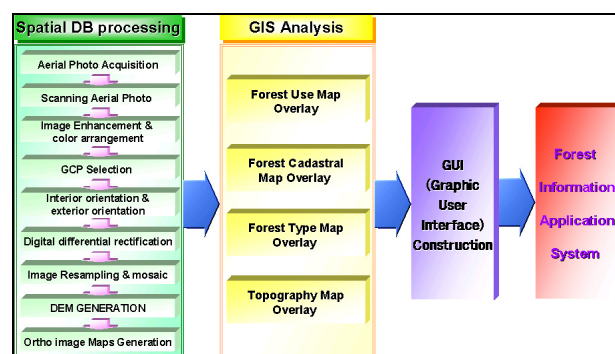**Fig. 1. Concept diagram of forest information application system**

Fig. 2. Steps to develop forest information application system

3. Designing and constructing forest information application system

This system was implemented based on Windows 2000 by using object oriented language such as Visual Basic 6.0 and GIS component such as MapObject 2.1 and DBMS(Data Base Management System) such as Oracle 8i.
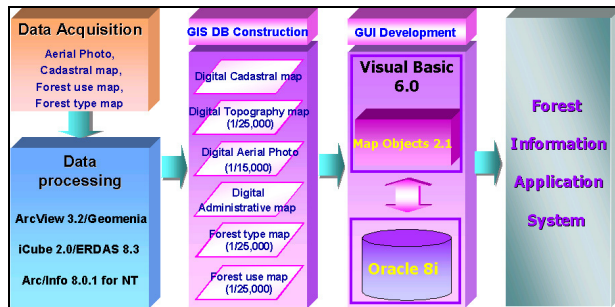

Fig. 3. Flow diagram of system implementation

1) System configuration

It is the main goal of GIS application system to visualize and process the spatial and attribute data in database to the various information type for users. Thus, this system mainly focuses on displaying functions to visualize the result of analysis and retrieve into maps, tables, and graphs.
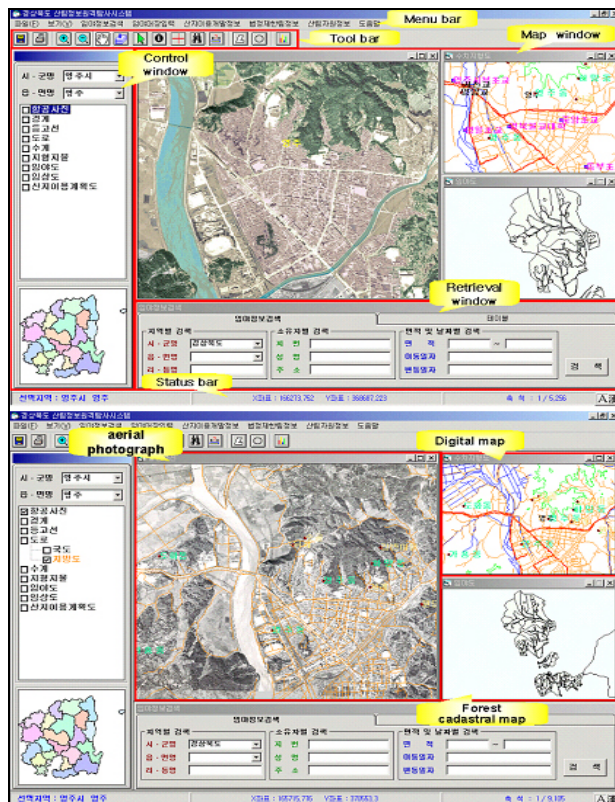

Fig. 4. Main system configuration

2) Map overlay controls

Fig. 5 shows the overlaid forest use map, forest type map, stream map, administrative map, and road map on a aerial photograph. The information related to topographic factors around the desired area could be acquired through overlaying other theatic maps on the aerial photograph.
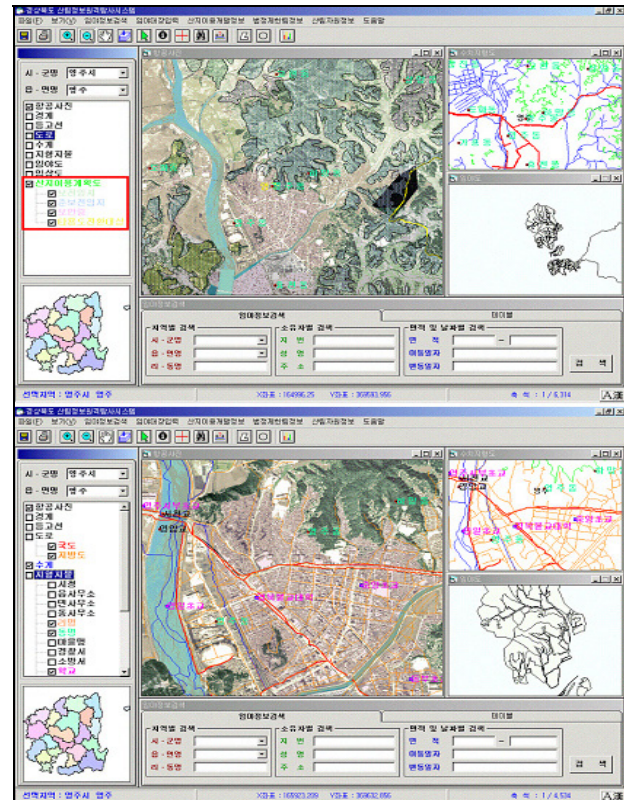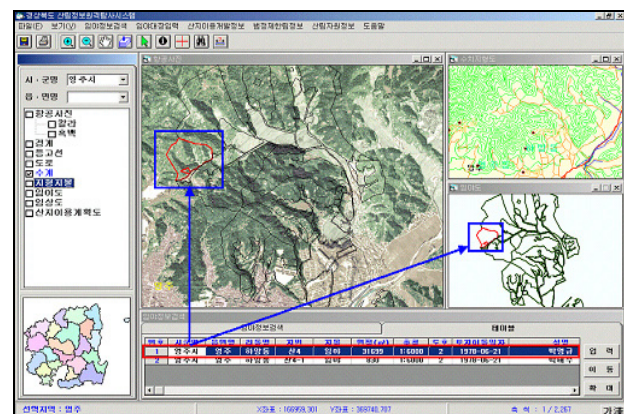

Fig. 5. Map overlay controls

3) Retrieving forest cadastral information

In order to retrieve forest cadastral information, the previous forest cadastral map and inventories based on paper files should be reprocessed in digital and then managed mapping the attribute data into spatial data.
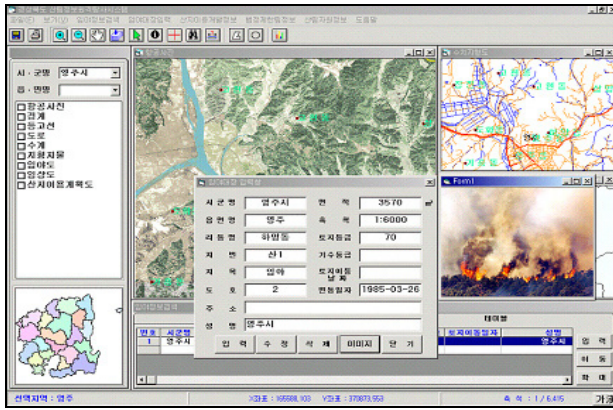
Fig. 6. Retrieving forest cadastral information

4) Spatial analysis though buffering

The spatial analysis though buffering is to possibly perform by identifying the radius of certain object and clarify the properties of object.
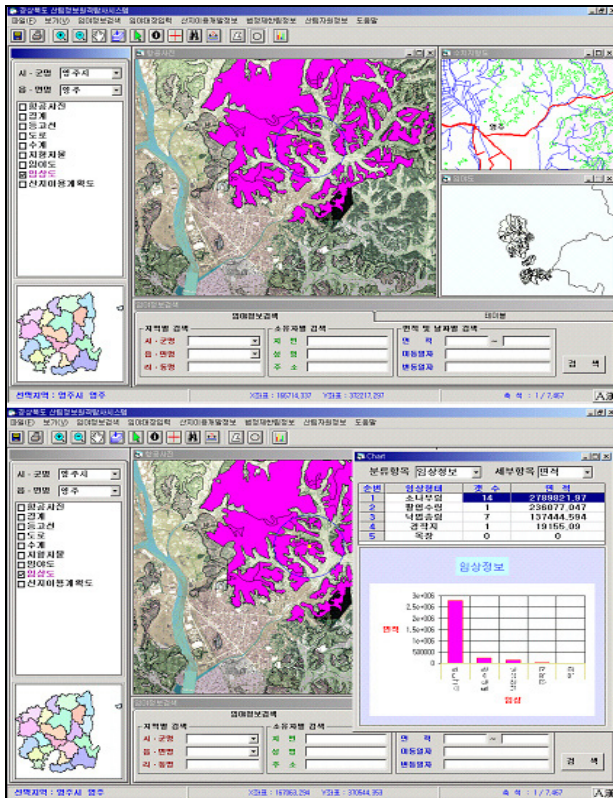

Fig. 7. Spatial analysis though buffering

4. Conclusions

In this study in order to process forest official affairs more effectively and scientifically the previous affaies, which is focused on the document and inventories, should be applied with the spatial information technologies. Especially, the forest information application sys-

tem has to be developed through using digital photogrammetry and GIS.

First, in order to construct forest resource database and map attribute data into spatial data, the integration among the digital photogrammetry, RS, and GIS is the main key to process these requirement.

Secondly, the rapid and accurate forest resource information will be provided toward the domestic forest officials through the forest information application system and shared between officials at a main department and officials located remotely.

Third, the foundation of domestic intelligent forest affairs and the share of standized data is expected to perform so that the higher productivity of forest officials will be acquired.

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