GIS SOLUTIONS FOR LOCAL GOVERNMENTS WITH IKONOS IMAGERY

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ABSTRACT:
Geographic information play an important role in activities of local governments such as management of land and water resources ,real estate transactions, land use development, city planning etc...So, state & local governments are very important GIS users. For many GIS applications of local governments, one-meter resolution will be more beneficial than other satellite imageries to acquire more detailed data. In addition, IKONOS' ability to acquire either 11*11 km images or bigger scenes in one pass allows municipalities to quickly and inexpensively update part or all their base map to follow up developments and changes. These advantages make IKONOS satellite imagery a data source rather than a product.

1. INTRODUCTION

Improvements in information technology have provided lots of opportunities to support data analyses. %80 of data acquired from survey is related with geography. So, GIS has a big portion in information systems. GIS is an organized collection of computer hardware, software, geographic data and personnel, designed to efficiently capture, store, update, manipulate, analyze and display all geospatial information.

Nearly every GIS user is a potential satellite imagery customer but especially provincial and local governments, utilities and telecommunications are three vertical markets that recognize the unique advantages of high-resolution satellite imagery such as having current, correct, faster and objective data; used as a base map and a data source, having a higher quality.

There are lots of advantages of IKONOS satellite imagery like acquiring 11*11 km images or bigger scenes in one pass that allows to get information through imageries quickly and inexpensively. 1 meter spatial resolution and ability to acquire stereo pair imageries are the other advantages of IKONOS.

In GIS applications, the basic handicap is the lack of up-to-date data. High resolution IKONOS images are the basic source to get updated geographic data. Through heads-up digitizing, vector base data can be generated from the imagery. The vector data is not a map but it is base vector data that is very useful in GIS applications.

2. AN EXAMPLE OF GIS SOLUTIONS FOR LOCAL GOVERNMENTS BY USING IKONOS

The overall goal of the GIS Management projects has been to maintain base data that includes updated features. Updated IKONOS imagery is acquired to maintain these base features. Local governments use accurate data as base maps. To use IKONOS imageries efficiently, they should have the same coordinate accuracy with base maps using by government authorities. So, production of raster data is the first step of the solutions with GIS applications by IKONOS. First of all, Precision Plus imageries are produced. After stereo image collection, ground control points (GCP) are chosen (figure 2) over geo images. Then, they are collected from survey and ingested to the system (figure 3). By this process, precision stereo images are produced. Over these precision stereo images, by tin editing, Digital Elevation Model (figure 4) is produced and with orthorectification process, precision plus images are produced. (figure 5) Steps can be seen in figure 1.
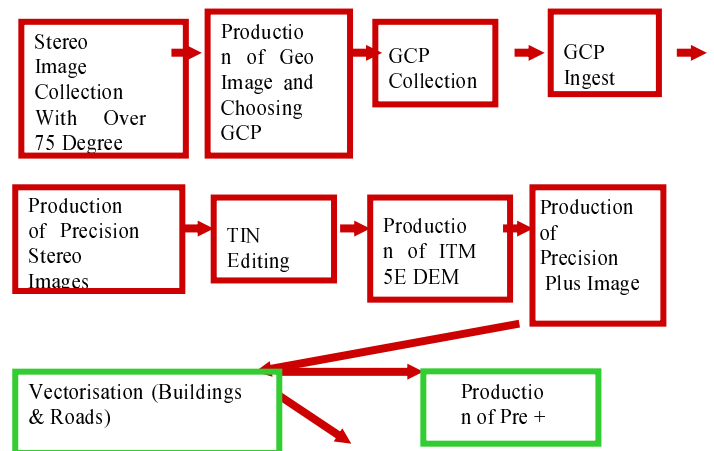

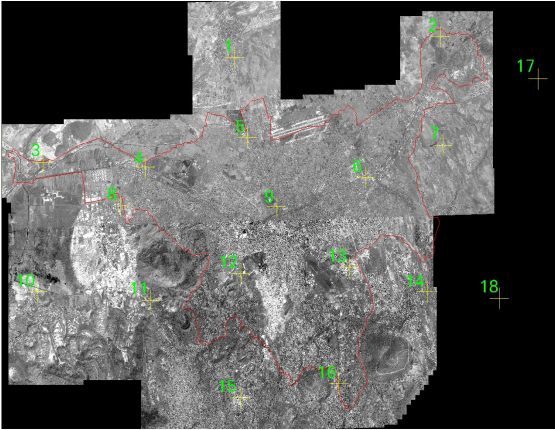**Figure1.** Steps of producing coordinate accurate raster data

Figure2. Choosing Ground Control Points (GCP)

Figure3. GCP ingestion

Figure4. DEM (Digital Elevation Model)

Figure5. Precision Plus IKONOS imagery

Producing vector layers from precision plus IKONOS imagery is the second part of these applications to have updated data. GIS applications can be developed if you have up-to-date geographic and non-geographic data. So, all spatial features that can be captured from imagery are digitized like buildings and roads (figure 6) and then integrated with their non-graphical data over the imagery (figure 7).
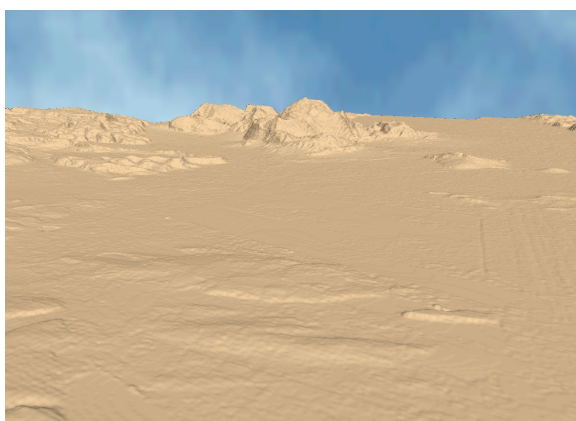

Figure6. Production of Buildings as Vector Layer

Figure7. Production of Roads as Vector Layer

All non-graphical data collected from survey like household information or road names are computerized and integrated to vector layers.

Software development is the other part of the project. There are many GIS software but every user should use these data efficiently. So, user-friendly and basic GIS software programmes have to be developed based on main functions. User can make queries, display and print maps, identify entities or edit data from these programmes.

This system provides useful tools for municipal authorities to efficiently manage and maintain public systems. The system described above provides user-friendly graphic user interfaces which allow non-GIS users to handle GIS functions with simple point-and-click over IKONOS imagery. (figure8)
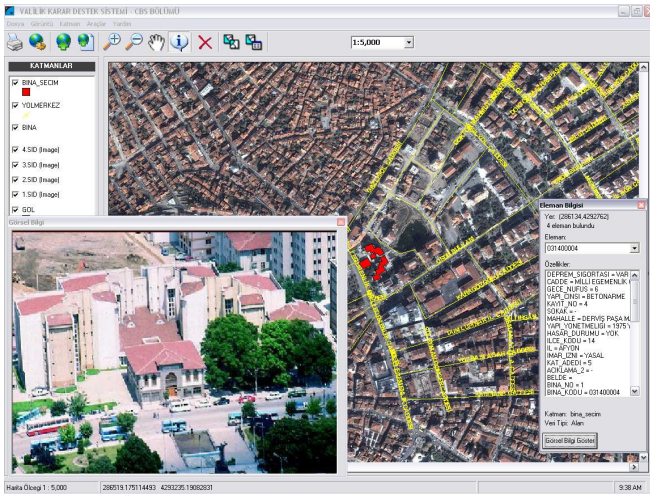

Figure 8 . Software developed for GIS applications

The aim of these projects is the integration of all the data stored in a database through developed interfaces, which give rise to the analyses, queries and updating within the operational system of the administration. That provides all the units in the administration to query and edit the data, in a multi-user environment.

3. THANKS
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4. REFERENCES

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