AERIAL PHOTOGRAPH ARCHIVES INFORMATION SYSTEM

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ABSTRACT:

In this information age, informatics technologies are developing rapidly. These technologies enable to reach and use the information in anywhere in the world at any moment. Governments which use these technologies, in e-government structure, help the developments by sharing the information it's got with all people, establishments and institutions in need.
In development period of societies, geographical information is the most important one. In this respect; studies about establishing a national information system and keeping it actual for Turkey and preparing a geographical database for General Command of Mapping are being carried on. Thus, geographical information can reach whole users, who need them, in network and can help them to make decisions.
In this study; a Aerial Photograph Archives Information System was developed by using Arc View (3.1) for archiving the aerial photographs taken by General Command of Mapping since 1930's. The area, including 1999 earthquake regions, which 1/100.000 scaled BURSA-G23 map covers, was selected as pilot project area and applications were put into practice in it. In the future, it is being planned to apply this information system for Turkey.

1. INTRODUCTION

The rapid development in computer and communication technologies accelerates the heading to the information society and causes the fundamental changings in economical, political and social structures of societies. This changing period is the fundamental element of world economy which grows up and abolishes physical boundaries. Information technologies change the economy- from production to commerce, from health institutions to publication, from tourism to entertainment-change the educational system, policy, public management, briefly whole aspects of life. The speed and content of business life is changing and with the globalisation, every part of world is becoming both a potential market and a potential rival. Science, technology and information management have created a new business life in "new economical environment".

Turkey began some serious and extensive structural searches, increasing day by day. It is for taking the advantage of infinite opportunities that information and communication technologies offer. Some applications based on information technologies not only force to be restructured and also widespread the process of globalisation. The pioneer role of the public management, for some areas in the first years of the Republic, could go on for the spreading of information technologies. The government, which will provide the way of "information public" to the people with the help of its own e-government identity, will gain the transparent, effective, productive and rapid government identity and also will have signed on very important economic applications.

The ownership and usage opportunity of information and information technologies may differ according to the development level of publics. As a result of the increasing requirement for the information, the data collection also increases by providing public development. Nowadays, it is seen that, information became a component that affects the production process as labor and capital. The work of collecting accurate information and arranging them is not only the problem of developing countries; it is also the problem of developed countries. The information collected every year increase two times according to the information collected in the previous year and cause dense information accumulation and traffic (Yomralıoğlu, 2000).

It is seen that, classical methods used in storing and presenting the information, that are used for decision making in every part of management, are as insufficient as the ones in collecting of them. In addition, the demand of reaching the information fastly, brings the obligation of using opportunities which the informatics technologies created. It is time consuming and expensive to collect information or to produce information from the data, on the other hand, it becomes more difficult to use the information sensible and at the proper time in dense information traffic. As a result of this situation, administrative units must be integrated with informatics technologies in structural and functional aspects, as e-government necessity (Uyan, 2004).

2. IMPORTANCE OF DIGITAL ARCHIVES IN INFORMATION SOCIETIES

E-government helps the governments to come closer to people and business life with the help of internet. Electronic public management can contribute in accelerating the changing into information based economy in candidate countries by

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encouraging the use of basic public services. In addition, e-government can improve and accelerate the public services and can reshape them so that they can be easily got and they can meet the needs. Transition to electronic interaction includes great changings, which are difficult to manage in institutions (Prime Ministery, 2002).

With December 4, 2003 dated and 2003\48 numbered circular, one of the goals of the Turkish Republic Government was declared as; "To form a government structure which is participative, transparent, active and which has the principle of having easy workflow for presenting fast public services in high quality". General Command of Mapping appropriated to carry out its jobs in this respect and has accelerated the studies of forming geographic information system and geographical database.

According to 4th article of the law numbered 657, General Command of Mapping has been charged with the duty of supporting public institutions with geographical products and supporting Turkish Armed Forces for defense purposes. Besides the other duties it is also responsible for,

- Taking aerial photographs in different scales, bathing and archiving them,
- Meeting map or photograph needs of ministries, public and private institutions according to existing law for them.

The aerial photograph archiving jobs are still carried out by traditional methods and need experienced person to accomplish. But the developments in informatics technology can effect and change the economical, social and cultural structures of societies. Accordingly; public and private sectors want to get the information they need, fastly and mostly from internet. In General Command of Mapping only geodetic and geophysics data are being presented by e-mail. But in the future all map and map information are aimed to supply.

General Command of Mapping has finished the technical study of presenting its products by using internet. After finishing the legal arrangements in Commerce Law with the leadership of Ministry of Justice and Ministry of Commerce such as digital signature validity or contract prepared in the internet, the needed information will be able to be sold through internet. For this reason whole archives and catalogues must be prepared in digital form. One of these archives is photo laboratory archives which have got the films taken since 1930's.

3. THE STRUCTURE OF EXISTING PHOTO LABORATORY ARCHIVES

Composing of films, after bath, on 1/100.000 or 1/200.000 scaled maps is prepared by a person in charge in Photo Laboratory Branch Office. In this operation which requires experience;

- Aerial photographs in strips are compared with the map.
- Aerial photographs are arranged in flight direction according to their overlapping ratio.
- Enough amounts of photograph center points are put in the map and combined.

Then these film rolls and diapositives are archived according to their dates and film numbers in Archives Section in same branch office. The maps that are used in composing are archived according to their names, in huge cabinets, in another room.

If it is thought that the whole aerial photographs, which have been taken since 1939, are in these archives, greatness and historical importance of these archives can be seen easily. The most important problem that this archives comes face to face, can be seen, if the films which have been spoiled and rotten despite ideal room temperature, archives faults and probable personnel negligence are appreciated, in this 63-year dynamic archives.

The formal aerial photograph requests from this branch office are:

- By the name of settlements,
- By coordinates,
- By map names in different scales,
- By drawn outlines on a map.

If the greatness of archives and one person in charge are thought, it can be approved that replies to these requests need dense labor and experience. It is evaluated that a Photo Laboratory Archives Information System which is suited to the technological development and meets the needs should be prepared. This system is essential to protect the whole aerial photographs since the beginning, to improve the archiving methods and conditions and to reply correctly and fastly to the photograph demands.

4. PHOTO LABORATORY ARCHIVES INFORMATION SYSTEM

The workflow of designing draft Photo Laboratory Archives Information System which was designed as sub-system of geographical database of General Command of Mapping, suited to Turkey National Information System, is presented in Figure.1.
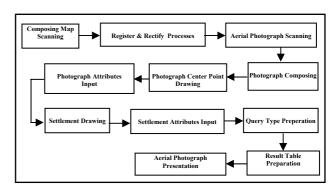

Figure 1. Draft Photo Laboratory Archives Information System designing workflow

After the system design, pilot project application phase was started. For this reason; 1/100.000 scaled BURSA-G23 map, which includes the 1999 earthquake region, was chosen. Then, in sequence:

- The last press of selected map was scanned in 254 dpi, and was kept in .tiff format.
- Then it was compressed by using MrSid format resulting from 28MB. to 4 MB. (1/100.000 scaled 393

maps, which cover all Turkey, keep approximately 2 GB.)

- 17 aerial photographs were put in system, which have been scanned in 300 dpi for different purposes before. These photographs were compressed by using MrSid format at 1:30 ratio. A compressed aerial photograph keeps approximately 3.5 MB.
- 295 flight strips in composing maps were digitized and they were put in flight strips layer with their attributes.
- Center points of 4234 photographs in flight strips were computed, drawn and kept as another layer.
- Photograph frames were drawn by using center point coordinates and photograph dimensions thus the areas, that the aerial photographs cover, were obtained visually. Then these drawn photographs were kept as a polygon layer.
- Attributes of center points layer, which includes the results of probable queries, were reevaluated and the attributes that would be presented to users were determined.
- The settlement information; 162 villages, and 7 bigger settlement area, that the pilot project area includes, were digitized and kept as different layers.

The result information that the users would get after queries can be listed as:
- Time of Flight
- Job Type
- Photograph Scale
- Film Number
- Photograph Number
- Focal Length
- Overlapping Ratio
- Direction of Flight
- Film Type
- Diapositive Information (Exist/Absent)
- Photograph Dimension
- Latitude of Photograph Center Point
- Longitude of Photograph Center Point
- The Path of Photograph in Computer

Query types were prepared as follows:
- **Query by the settlement areas:** This query was prepared to answer the aerial photograph requests by using settlement names like village, city, county etc. The query is applied by comparing the settlement in its layer, selected from related menu according to the user's selection, with the aerial photographs layer.
- **Query by coordinate:** This is a query type which is applied by the user's point coordinates input. The required background was prepared for accepting the inputs, UTM or geographic coordinates. Then the script, that calls coordinate transformation macro and applies the query, was written.
- **Query by map name:** In this query type, which was prepared to answer the aerial photograph requests by giving map names in different scales, the maps from 1 / 100 000 scaled to 1 / 1 000 scaled were included. To form map index of study area, only names of totally 8521 maps, prepared in determined scales above, were entered as attribute data and the maps in every scales were kept as polygon features in separate layers.
- **Query by giving point data on the screen:** The raster map, which belongs to study area and has no layer on it, comes on the screen and the user draws the feature, on which

the query will be done, with the mouse. The query is applied by comparing the selected area with the aerial photographs layer by the help of a prepared script.
- **Preparing of result table and presenting of requested aerial photograph:** The determined attributes above that is belonging to aerial photographs are shown in a result table obtained from an applied query. It is essential to click the 'Photograph' button, underside the screen, for showing the aerial photographs existing in the result table. When this button is clicked, a new viewer is opened on the screen and the selected aerial photograph is seen. The required buttons for applying different processes with these photographs and taking outputs of them are present on the upper side of the screen.

In the design of Photo Laboratory Archives Information System, 'Drawing of Perspective Centers of Photographs' and 'Entering of Photograph Attributes' were the most time consuming phases. These phases have taken 7 workdays for the selected pilot project.

Because the query options have been prepared in the design phase, they are suitable for every map. Because the scanning process of the maps and photographs is continuing in General Command of Mapping, it will accelerate the workflow to start this process with the already scanned maps, when the system is put into practice

Because the settlement places layer will be taken from Cartography Department, it is supposed that one map will be finished approximately in a week with two personnel and one computer.

5. CONCLUSIONS

The developments in informatics technologies not only force the public structures and managements to change but also reshape the international relations by increasing the globalisation. In this respect; managements are trying to largely use new technologies to increase the speed, production and activity in public services. In this age with increasing information traffic, it is very difficult to store and present the data with traditional methods. As a result of this, dense studies are being carried to prepare information systems and databases in governmental and institutional scales.

In General Command of Mapping, in this scope of transferring archives to digital forms, studies for preparing Photo Laboratory Archives Information System has come to an end. When the system is put in practice, it will be able to query by using settlement names, coordinates, map name and by entering the points forming a query feature on the screen and also it will be able to prepare result table and present the aerial photography.

With the application of Photo Laboratory Archives Information System it will be able to protect and control the sole and historically valuable aerial photograph archives, accumulated in years, in Turkey. Also with replying to photograph requests fastly, the archives will be used productively. Because the hardware, software and person in charge exist in General Command of Mapping, there will be no additional cost in application of the system. With the coordinated work of existing components; a contemporary archives which is suited to e-government philosophy and open to the world by means of internet, will be able to be acquired.

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