A NEW METHOD OF PHOTOGRAPHIC IDENTIFICATION IN FIELD WORK — EPSA PHOTOGRAPHIC IDENTIFICATION SYSTEM

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ABSTRCT

The surveying and mapping of large scale topographic maps by aerial photogrammetric method will be more widely utilized in many large and medium cities in China . This paper proposes that the data acquisited by the stereocomparator (or analytical plotter) input into EPSA, displaying and mapping in real time. In field work, identified the digital map, editting and revising instantly by using EPSA on portable computer. In the office work,after appropriate editting and modifying, it can be mapped by digital plotter which controlled by EPSA, and stored in mapbase or transfer into GIS. This method can raise the accuracy of photogrammetric mapping,and also improves the efficiency of works.

EPSA,is a system for data acquisting and mapping in real time developed by Civil Engineering Department of Tsinghua University and Tsinghua Sunway Technical Company. It can provide interface with communications of various Total Stations, interface with communications of digitizers, interface with communications of sterocomparators and analytical plotters. The data acquistion by the above instrument can be receive directly. In the field work, EPSA is installed on a portable computer,the screen is used as a plate table display topographic map in real time, so it is called EPSA (Electronic Plate-table System for Aerial Photogrammetric Surveying).

EPSA is a surveying and mapping system developed in Windows operating system with C + + language. It is suitable for the surveying and mapping of large scale topographic maps, cadastral maps, thematic maps and engineering maps. The EPSA can completely replace the traditional surveying and mapping method. It will record the observed data and display the topographic map with the symbols of object in real time.

1. MAIN FEATURE OF EPSA

1.1 Surveying and Mapping in Real Time

The surveying data can be processed in real time and the topographical maps can be generated in field automatically. The integration of the field and indoor operating makes it easier to find mistakes in time.

1.2 EPSA Established a Set of Topographic Symbol Library with National Standards for the Scales 1:500,1:1000,1:2000 Topographic Map and the Coding System.

The symbol and coding system can be queried and displayed at any time during the creation of maps in the field.

1.3 Powerful Graphic Editor

EPSA adopts the object-oriented design which makes the editting of graphic maps simple and convenient,especially for site edit.

1.4 Provide the Function of Photographic Indenfication

For examples: surveying and mapping in real time; powerful graphic editor; correction of eaves ; lettering of geographical names; populated place names, oronym...; calibrating, surveying and mapping of ground altitude.

1.5 GIS Oriented Design

1.5.1 The codes and the cartographic symbol base form a system. The codes are correspondent with the cartographic symbols. Corresponding code are input with setting of the position of points. EPSA will mapping automatically by transfer cartographic symbols.

1.5.2 Setting of layers freely. Using EPSA, maps can be divide into any layers freely by different codes. It can set suitable corresponding layers for different GIS and transfer data into GIS smoothly.

1.5.3 Establishment of spatial data base. In order to further manage and utilise the information of surveying and mapping, spatial data base was designed meticulously in EPSA.It consists of six structures: point, line, ground object, object, lettering, attribute. Here, "object" means a group of ground objects, i.e, a lot of ground objects merged together for certain purpose. The overall artical is called "object". This design overcomes the difficulty on surveying and mapping of certain ground objects, and also utilizes the data of surveying and mapping.

1.5.4 The "swallow and spit" function in EPSA. It ensures the accuracy of edge connection betwen maps, pays particular attention to efficiency, and enables the update of former maps at some parts of an area. For examples, "spit" the parts of former map which required to be updated,then "swallow" the maps of this areas surveyed in recent time, and combine it with the former maps.

1.5.5 Interface for GIS. EPSA has taken the interface for GIS into account,so it can be used as an important data source and data updating method for GIS.

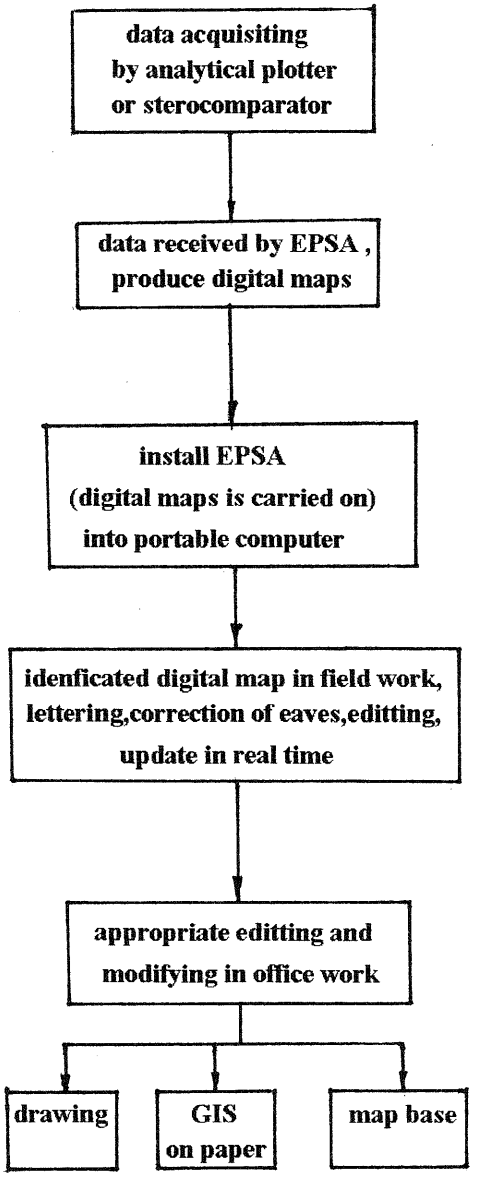
2. NEW METHOD AND PROCEDURE IN IDENTIFICATION AND MAPPING OF AERIEL FILM

In most cases, there are two ways in identification and mapping of aerial film at present time.

1) Using enlarged aerial film identified in field work, and the idendified photograph is the reference for acquisition and mapping by photogrammetric instrument. It is generally available in small scale photogrammetric mapping.

2) Using drafting sketch acquisiting and mapping by photogrammetrc instrument identified in field work, and then digitized by digitizer. It is generally available in large scale photogrammetric mapping.

EPSA,a system of acquisiting and mapping in real time,has many functions, such as: editting of surveyed pattern,correction of eaves, surveying of "swallow and spit",lettering. The new method and procedure in identification and mapping of aerial film when utilized these functions is state as following:



The main points of the new method are: the digital map can be produced from aerial films directly; EPSA identificating and mapping in the field work; editting, updating and lettering in real time. It ensure the perfectness and correctness of maps. After approciate editting and modifying in office work,the maps can be plotted on paper,or transferred to GIS,or input to mapbase.

The key point is that it must be provided with a mature, perfect and practical software — EPSA.

This new method is available for large scale photogrammetric mapping,and is also available for small scale photogrammetric mapping,.Only the three modules listed as follow should be installed:

. Module of projective coordinate system transformation;

. Module of small scale symbol system;

. Module of pattern wandering function.

Then the small scale map can be identified by EPSA. It can be mapped directly and the procedure of film idendificaion is not needed.

The new method has been improved obviously in many aspect, such as: operating convienietly, raising accuracy of maps,efficiency in mapping and drawing.

This method is now utilized in practical applications.