

While the use of automated graphics has substantially reduced the number of drafting personnel heretofore required and permitted reallocation of manpower resources, conversion to an automated mapping system has also necessarily upgraded and expanded the responsibilities of all personnel involved.

The modular conversion program for modifying individual stereoplotter units for automated mapping has worked very well with little interruption to the Department's existing schedule commitments. With the host IBM 370 computer readily accessible in the same building, card handling from each independent stereoplotter unit offers no serious production problems; however, use of the keypunch collection system limits rapid editing capabilities, consequently reducing the potential efficiency of the system. To overcome edit deficiencies and optimize the overall system, the Department intends to replace the individual keypunch data collectors with multiple automated stations. Each automated station could consist of three to five stereoplotter units with digitizing accessories, a cathode ray tube (CRT) display with a hard copy unit and a mini-computer. This equipment configuration will permit each stereoplotter operator interaction between the digitizer, mini-computer and the CRT display.

The published version of this report may be obtained by addressing your request as follows:

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SUMMARY REPORT 40-1F(S)



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**IMPLEMENTATION OF
AN AUTOMATED
MAPPING SYSTEM**

**SUMMARY REPORT
OF
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**Cooperative Research Study of The
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**TEXAS HIGHWAY DEPARTMENT
Austin, Texas**

Implementation of an Automated Mapping System

by

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Manual methods of photogrammetric map compilation and graphics presentation for highway engineering applications have some objectionable limitations including the allocation of manpower resources and inflexibility of the maps. Therefore, the Texas Highway Department has implemented an automated mapping system, into the production environment, which is flexible enough to allow full utilization of information in multidisciplinary engineering applications and provides an effective method for collection, storage, manipulation and retrieval of large volumes of map data.

Preliminary investigations using an existing stereoplotter with its Y-Z digital output modified to yield X-Y data demonstrated that numerical information could successfully be collected with this type of equipment configuration. At the present time the Department has converted six map compilation stereoplotter units for automated data collection, with each unit containing an equipment configuration as shown in the figure. The four remaining map compilation units will be equipped with similar data collection equipment this fiscal year.

The program which was developed and written for the automated mapping system is called the Texas Automated Plotting System (TAPS). It performs the following functions:

1. **Edit and Special Routines** - The digitized data is edited for various stereoplotter operator input errors. These errors are noted and corrected within the edit procedures. A coordinate transformation adjustment also occurs wherein the X-Y machine coordinate values of the various map features are converted to project ground coordinates.
2. **Storage** - The project data base file is stored on a disk and is readily accessible for manipulation.
3. **Manipulation** - Manipulative capabilities include total or selective graphics, variable scale formats, and perimeter and area computations.

TAPS is written in IBM 370 Fortran IV. It is presently designed to generate plot tapes for use with a CalComp 1136 plotter but could be modified to produce commands acceptable to most plotting systems.

This Automated Mapping System provides an effective method for collection, storage and retrieval of large volumes of map data, and offers the engineer flexibility for automated manipulation of the map data heretofore unavailable. The cost involved in obtaining map data using automated methodology is comparable to the cost of maps produced using manual techniques. The added expenses of equipment depreciation for the digitizing accessories, computer time, editing and precision plotting are offset by the substantial reduction in the number of man hours required to complete the job manually.

