

NAME OF SYSTEM:

**National Weather Records Center
(FOSDIC IV)**

ORIGINATOR:

**Weather Bureau
Environmental Science Services
Administration
Department of Commerce
6010 Executive Blvd.,
Rockville, Maryland 20852**

OBJECTIVE. To establish a practical system for gathering, processing, and storing large masses of Weather Bureau observation data. Further, to store this data in a format suitable for high-speed machine searching in connection with weather research programs.

BACKGROUND. The Regional Weather Records Processing Centers are responsible for routine processing of domestic United States Weather Bureau surface observations. The National Weather Records Center routinely processes upper-air data, marine data, and data gathered outside the country. Punched cards and computer processes are used in all stages of the various weather observation tasks. Upon completion of routine processing, the punched cards and other source records become part of the permanent record collection maintained at the National Weather Records Center, Asheville, N.C.

The successful employment of data processing equipment for the preparation of climatological statistics began in 1936 when punched cards were used for summarizing more than five million marine observations. Since then the use of punched cards has accelerated constantly, and by 1961 the Asheville facility contained over 400 million cards.

With the knowledge that punched cards are not the best medium for permanent storage of this historical data, the Weather Bureau turned to the microfilming of these records. To more effectively perform this task, a special camera was designed which microfilms punched cards at the rate of 840 cards a

minute. This capability allows for a placement of 12,000 card images on each 100 foot roll of 16-mm. microfilm and reduces the data space needs by a ratio of 180 to 1. The original microfilm is retained in the master file and a positive film is produced for the working copy on which the punched holes appear as transparent square spots.

In the late 1950's, to make the microfilm punch card images practical as a machine processing medium, a high-speed electronic optical film reader called FOSDIC II (Film Optical Sensing Device for Input to Computer) was designed and built by the National Bureau of Standards and placed into operation at the National Weather Records Center. This equipment had the capability of searching any 10 columns of card images, based on plugboard programming, at a rate 5 times faster than that of punched card input.

THE NEW METHOD. A new Model IV FOSDIC developed by the National Bureau of Standards was recently integrated into the Weather Bureau's Asheville, N.C., data processing activity. This model FOSDIC IV is especially designed for rapid scanning and selection of data and can read the punched card data contained on microfilm 4 times as fast as the FOSDIC model II. This processing rate corresponds to a column-by-column examination of 2,000 full cards per minute.

Using a plugboard program, an electronic optical scanning device reads the spots on the microfilm created by the holes in the punched cards and converts the spots to binary-coded information on magnetic tape. The data on the magnetic tape can then be used as input to normal computer processing.

To better understand the full processing cycle of historical weather data available for study, let us assume that a group of meteorologists wish to study the winter season, West Coast entry point of storm tracks arriving from the Pacific Ocean. The group feels that the scope of research should include all records of the area accumulated since 1960. Further, let us assume that these 400,000 records, representing the weather data for the period, are still in punched card form at the Weather

Bureau's National Records Center. Initially, these cards become the input to the micro-filming processing sequence and conversion to microfilm. The FOSDIC IV operation next transcribes the microfilm data into binary-coded magnetic tape. Finally, based on somewhat sophisticated computer programs, the magnetic tape is processed through the computer with a resultant printout of the requested data.

REMARKS. The Weather Bureau initially turned to microfilm as a permanent storage method because it insures file integrity and lasting record life. It is also reproducible at a relatively low cost. The punched card means of permanent storage has such limitations as bulk, a tendency to deteriorate over a period of time, and the possibility of loss or mutilation. Additionally, microfilm is far faster as input to computers.

NATIONAL WEATHER RECORDS CENTER

