

U. S. DEPARTMENT OF COMMERCE  
ENVIRONMENTAL SCIENCE SERVICES ADMINISTRATION  
WEATHER BUREAU  
NATIONAL METEOROLOGICAL CENTER

January 1969

PROSPECTUS FOR AN NMC DIGITAL FACSIMILE INCODER MAPPING PROGRAM

OFFICE NOTE 27

H. A. Bedient  
Data Automation Division

NMC has been building up packages to support the Digital Facsimile Incoder (Facsimile Group Converter) on the IBM-7094 and the IBM 360/30. At the present time, we are preparing to convert these programs to the CDC 6600. The program is divided into a set of subroutines controlled by a main control program. Every effort is being made to provide programs that are as convenient and simple to use as GRDPRT or WPP13 (the contouring programs for the printer).

The DFI allows much more power for labelling, multiple sets of contours, plotting of data, addition of various background maps, etc. This means there will be interest in use of the internal subroutine packages to form customized displays. Every effort will be made to make critical parts of these packages optimal so that they will be inexpensive in machine time and storage area.

The various facilities that will be available for processing fax-converter output will be the two fax-converters belonging to the NESC (National Environmental Satellite Center), and the four fax-converter interfaces (DFI) soon to be installed on the NMC IBM 360/30. The Satellite Center machines require the input data on tape one scan-line per record in either gray-level or black-and-white format. The IBM 360/30 will be able to handle a map encoded in the form described in the attached note for the DFI program, or in a compressed scan-line form under development. The Varian high speed graphics device under development will handle the compressed scan-line form. Either the Satellite Center fax-group converters or the IBM 360/30 interfaces will be able to go directly into the major fax networks at an assortment of speeds, or print out locally at high speed on a monitor receiver.

The background maps available for fax-converter output at present consist of a North American 18 by 18 inch 1:20,000,000 polar stereographic section and an approximately 1:23,300,000 U.S. two-panel left and right section that is presently used for the FD winds aloft. Mercator 1:20,000,000 charts are in preparation from the Satellite background map file. Other background maps will be produced from this source as required. Implementation of this program on the CDC 6600 will initially be for contouring and labelling only so as to expedite conversion of forecast charts to the fax-converter form. Plotting in the CDC 6600 will be added later. Following is a list of the present subroutines and their functions:

**ROTATE:** This takes an input array specified by an index table. It interpolates a 27 by 27 sub-array at any rotation angle or any corner point changing scale if indicated. The interpolation is Bessel's bi-quadratic. Any points lying off the input array will be set to an arbitrary value in the sub-array. Therefore, the sub-array can fall over the boundary of the input array. The scale of the inset map is fixed at this point. The contour interval and the base contour are set at this point. A table of constants standard for each standard array and each standard background map is required as an input parameter.

**INTERP:** This performs the same function as ROTATE except that an input parameter is a 27 by 27 complex array of the vector location of each point of the 27 by 27 array in the input array. Therefore, this code can convert map projections. The map projection formula is used in generating the complex transformation array. All of the remaining routines work from sets of the 27 by 27 inset arrays.

**CENTER:** This finds a maximum or minimum grid value according to the rules of the present IBM 7094 curve plotter program and finds the value of the neighboring center and its exact location on a quadratic surface fitted to the neighboring 9 points. This works in a specified 27 by 27 array.

**CNTR:** This passes through the 27 by 27 array and locates contour vector elements in the order required for assembling scan-lines for output. Within CNTR, decisions are made about line weight inserting or deleting vectors according to the requirements of dashing. Later, provisions will be made to implement the intermediate contour provision of the curve plotter program. CNTR output contour labels whenever a contour crosses one of up to three previously specified cut lines, and can output shading between specified contour values. CNTR can have up to three input 27 by 27 arrays with associated tables and will merge the output line by line to produce a single map in the intermediate form ready to merge with a background map.

**HELL:** This will generate large size H or L characters merged into CNTR on the output from CENTER.

**LABEL:** This will take the output of CENTER and the label output of CNTR and merge them into a label file of the intermediate form required by the IBM 360/30 program.

**PLOT:** This will provide the sorting and thinning facility. Input data for plotting will be in BCD, formatted according to the NMC upper air or surface plotting model. It will be sorted and thinned to prevent overlap according to the priority and plot model size set by the user. The NMC upper air plotting model is defined in the original NMC-UAC document. The surface plotting model is in the process of definition. Any symbol in the set available can be centered anywhere in the plotting model. In order to provide clarity in the present weather and cloud symbols, some symbols occupy more than one line in the model. The user is responsible for arranging requested data so overlap does not occur. Blank entries are not plotted.

**MERGE:** This will take background maps in the compressed scan line form and merge in the contour elements to output a compressed scan line form. Later, the plotting model will also be transferred. This will take the strain of a large number of charts off the IBM 360/30 so its role will be primarily switching.

