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MEMORANDUM FOR THE RECORD: 21 December 1965

SUBJECT: ADP Briefing for the Staff of CD/BI, 9 December 1965

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File

1. Purpose

The briefing was essentially a progress report on planning for automated mapping. Because much was new material, the purpose of this memorandum is to document that information.

2. Background

a. For those unfamiliar with automated mapping, a brief explanation is in order. Initially, the coordinate of any mappable feature is recorded. If the feature is a line, such as a boundary, a sequential series of coordinates is registered. A discrete point, such as a city, is a single coordinate. The value may be recorded initially as a geographical coordinate. However, because this is a very time-consuming job, it is better to record points in cartesian (also called X-Y) form using an electro-mechanical device such as a digitizer. A computer is next employed to convert the cartesian coordinates into geographical coordinates. These points, once in proper digital form on magnetic tape, disk, or punched card can be recalled, with some limitations, for use in any projection at any scale. The computer is also used to convert needed coordinates from geographic to cartesian form. The automatic plotter then uses the resulting magnetic tape to plot the required lines and points.

b. The World Data Bank Committee made a preliminary study of the idea of placing world planimetry into digital form for later automatic plotting. A system of arbitrarily numbered line segments arranged by continents was devised. To test this scheme, a simulation was carried out with successful results. The Office of Computer Services (OCS) then undertook a preliminary study based upon the work of the Committee. The study has not yet been completed.

3. The Future System

a. The system of the future will require three main components. Initially, there must be a digitizing device, then a computer, and lastly an automatic plotter. A digitizer has been scheduled for purchase in FY 1967. The computer, located in the Computer Center, is and will continue to be available. Currently we are using the plotter belonging to the Office of Special Activities (OSA) of the DD/S&T. On 15 January 1966, OCS will receive its own interim plotter while awaiting a more precise model scheduled for delivery on 15 July 1966. A plotter for CD/BI has been planned for FY 1969.

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b. It is hoped that by the time CD/BI gets its own plotter not only plotting charts and world, regional, and country base maps will be automatically drafted, but that substantive worksheet compilation can also be incorporated into the system.

4. Implementation

a. Implementing the future model will depend on three things--- current experience, availability of hardware, and planning. Current experience has been an essential ingredient all along. The plotting charts, compiled for the most part in CD/A, have provided experience and have stimulated further development. For example, the first plotting charts consisted of unconnected coordinate intersections. Next selected points along coastlines were added and the coastline was manually interpolated. Then came special lines such as spirals. Full coastlines and grid lines are currently being perfected. The hardware required for the future was detailed in the previous paragraph. Inasmuch as a computer and a plotter are currently available, the digitizer becomes the missing link.

b. In the planning area we have the past work of the Data Bank Committee and the OCS Feasibility Study as a basis for further study. To complete the required planning, it is necessary to (1) design the data bank; (2) develop retrieval methods; (3) develop file maintenance procedures; and (4) develop plotting procedures. I propose that two consultative committees, the existing World Data Bank Committee and a new Digitizer Committee, do the work. Working with OCS, these committees would have the following tasks:

Data Bank Committee

- (1) Determine what features to digitize
- (2) Select maps to be digitized
- (3) Develop specs for defining line segments
- (4) Develop specs for unique identifiers
- (5) Develop indexing scheme

Digitizer Committee

- (1) Draft digitizer specifications
- (2) Select digitizer
- (3) Develop digitizer procedures
- (4) Develop file maintenance procedures*
- (5) Develop plotter procedures

*
Could be performed by either committee.

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c. The timing of the work of these committees is critical. Assuming that the OCS study will be completed and accepted by the end of January, we would have to initiate the committees sometime in February. Their work should be completed by the end of next summer. The work of both committees could be concurrent and I would act as chairman and workhorse for each. Then, assuming the delivery of a satisfactory digitizer, sometime in FY 1967, the world could be digitized by the end of the fiscal year. When the initial Data Bank is completed, the resulting planimetry will be available not only for plotting charts but also for world and regional maps. In FY 1968, we would be able to begin digitizing the planimetry of country base maps. The resulting files would be used to automatically draft the base maps and supplement the Data Bank. Once the Data Bank and the base map program became operational, experimentation could begin on the digitizing of substantive material. Such a step could result in the elimination of worksheets and subsequent manual drafting exclusive of type and symbols. It is hoped that the process could be implemented by FY 1969 when our own plotter is scheduled. If feasible, digitizers would be acquired for all units.

5. Personnel Considerations

a. The details affecting personnel have admittedly not been worked out as well as the subjects of the preceding paragraphs. In compilation, mappable changes will have to be closely followed and entered into the Data Bank. There will be a greater emphasis on projections and the digitizing process learned. In drafting, automation will require training and work on shifts to operate and maintain the plotters. Hand work will become restricted to short-deadline maps, non-maps, and fineline drafting. The net effect on drafting personnel will probably be an upgrading of positions with no significant change in numbers employed.

b. One new position in CD/BI does emerge clearly from previous discussions. That is the job of digital librarian. His duties would be as follows:

- (1) Receive requests for data bank changes
- (2) Digitize required changes
- (3) Arrange for conversion and file integration
- (4) Maintain data bank index
- (5) Receive requests for specified maps
- (6) Convert requests to machine language
- (7) Arrange for file retrieval and distribution
- (8) Be the operational exchange point between CD/BI and the Computer Center

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Attachment