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TID/TAB - 77/65
1 September 1965

MEMORANDUM FOR: Chairman, Photographic Interpretation Production Board

SUBJECT: Metrical Exploitation of Non-System Aerial Photography

1. Given any airborne camera system there are three principal steps in preparing to make metrical determinations from photography obtained with that camera system. These are:

a. Study the actual functioning of the camera during the imaging process and formulate a mathematical model to describe its behavior.

b. Program the mathematical model in a form suitable for "production-line" use in obtaining the desired metrical information.

c. Obtain the values of the various parameters that must be entered into the model to make it applicable to a particular frame of photography taken with the camera system in question. These values can be divided into two classes:

(1) values that are invariant for a given mission (e.g., focal length, IMC cam constant);

(2) values that may vary from exposure to exposure (e.g., scan rate, camera position, camera attitude).

2. Steps a and b will be discussed together. All of the camera systems now operational or proposed for operational use fall under a very few mathematical models. Thus all flat-film plane between-the-lens shutter cameras are logically equivalent, all transverse-sweep panoramic cameras with IMC lens translation are equivalent, etc. All save one of these models (i.e., flat-film plane with focal-plane shutter) have already been programmed for production use in this Center. However, each camera system must be reviewed in detail to establish what model it instances and to verify that it is accurately represented by that model.

GROUP 1
Excluded from automatic
downgrading and
declassification

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3. As a premise for our discussion of the problem of obtaining parametric values we have assumed that all military recon systems will provide for the recording of data in the DoD data block format. There are two steps in the process of utilizing such data:

- a. Automatic transfer of the information recorded on the film in the data block onto a computer-readable media.
- b. Computer translation of the data block information into a form suitable for subsequent entry into the camera model as parametric values.

The first step involves the development of special film reading equipment and this action has already been initiated by the Plans and Development Staff. The second step will require design and implementation of a computer program by IPD.

4. In the light of the preceding discussion this subcommittee recommends that the Production Board approve the following actions:

- a. TID will review all camera systems and publish for each a brief description of the camera which will include a statement as to which model the camera exemplifies, the nominal values of fixed parameters (e.g., 6 inch focal length, 30° depression angle), and where other parametric values may be obtained. In determining the order of consideration, first priority will be given to systems now operationally committed. Future systems will be studied in the order of their planned operational readiness.
- b. IPD will proceed with the programming of the flat-film plane focal-plane shutter model. Additionally, IPD will program the translation of computer-readable images of the DoD data block and provide for output from this translation in a variety of forms, including human-readable listings.

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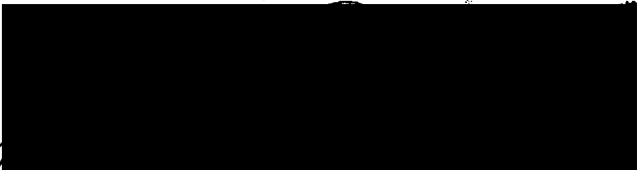
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c. P&DS will aggressively pursue the development of an automatic data block reader that will accept a wide range of film formats.

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Subcommittee for Mensuration and Technical Support

Distribution:



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