TOP SECRET

CONTROL NO. BYE 41823-5
Cy 12

REFERRED TO OFFICE	RECEIVED			RELEASED		SEEN BY	
	SIGNATURE	DATE	TIME	DATE	TIME	NAME & OFFICE SYMBOL	DATE
CMD		10/25	1500				

(OVER)

Handle Via Indicated Controls

BYEMAN- TALENT -KEYHOLE

Access to this document will be restricted to those persons cleared for the specific projects;

EXCART

WARNING

This document contains information affecting the national security of the United States within the meaning of the espionage laws U. S. Code Title 18, Sections 793 and 794. The law prohibits its transmission or the revelation of its contents in any manner to an unauthorized person, as well as its use in any manner prejudicial to the safety or interest of the United States or for the benefit of any foreign government to the detriment of the United States. It is to be seen only by personnel especially indoctrinated and authorized to receive information in the designated control channels. Its security must be maintained in accordance with regulations pertaining to BYEMAN-TALENT-KEYHOLE Control Systems.

TOP SECRET

GROUP 1
Excluded from automatic downgrading and declassification

BYE-41873-65
21 October 1965

Copy 12

MEMORANDUM FOR: Chief, Plans and Development Staff, NPIC

ATTENTION: [redacted] STAT

SUBJECT: Imagery Evaluation, 116-A Camera ~~Type II~~

REFERENCE: NPIC Project 22036-6

1. General:

a. In response to reference requirement the Photographic Analysis Group (PAG) has conducted a limited evaluation of imagery obtained with the 116-A camera under the OXCART test program. The purpose of that evaluation was to determine the amenability of 116-A imagery to the various analytical functions performed, and equipment utilized, in the exploitation of operational reconnaissance imagery.

b. The evaluation was limited in that the relatively small number and limited types of targets covered by the test mission precluded realistic exercising of the PAG resources. However, while the overall impact which a full, operational mission might have on the PAG could not be assessed it was possible to evaluate the general utility of the test imagery with regard to the PAG mission. During the course of this evaluation the functional areas of; "Analytical Exploitation Procedures", "Exploitation Equipment Utilization" and "Exploitation Support" were examined with regard to utilization of 116-A imagery in performing those functions.

2. Discussion: The results of the PAG evaluation are summarized below under two-major "test objectives" encompassing the areas listed above:

a. Objective 1: Determine the amenability of 116-A imagery to the performance of the tasks involved in mission scanning to include target location, identification, analysis and reporting, and equipment utilization.

(1) Utilizing a two man team the scanning task was accomplished without particular difficulty. The method for accomplishing the task most expeditiously is to employ two Richards 940 MCE light tables with two photo interpreters facing each other and the film oriented so that they view the image scene in the same orientation along the flight line. This method allows for coordinated scanning of those areas covered by both cameras (fwd and aft) and allows the added flexibility of "scanning ahead" by one team member as required. It is possible to scan one camera with the Richardson Viewer but the area of no convergent camera overlap

BYE-41873-65

SUBJECT: Imagery Evaluation, 116-A Camera

requires scanning with periodic use of the B&L zoom microscope (mono mode). It is not feasible to require one team member to scan both frames with the B&L zoom microscope as is done with the 112-B camera system imagery. The limiting factor with the 116-A is the frame size (8"x36"). The use of the Richardson Viewer is not considered essential to the scanning task since the scale of the imagery and the amount of overlap between and within the two cameras furnishes adequate assurance that significant targets will be detected with at least as much reliability as would be the case utilizing the Richardson Viewer.

(2) The 116-A imagery has no unique characteristics affecting the tasks of target location and identification except when stereo viewing is required to accomplish the latter. Since stereo viewing is required in order to accurately identify some targets and is required even in a preliminary analysis of most targets a problem area does exist in utilizing 116-A imagery for these tasks. The 116A camera system as indicated earlier furnishes overlap suitable for stereo viewing in two methods. The first of these is the overlap furnished by successive scans of the same camera. The second is the overlap resulting from the dual camera convergent coverage which extends out to 30° on each side of nadir. The problem of obtaining stereo of selected targets can be solved in a straight forward manner by cutting stereo pairs from work copies of the film. A second method which is suitable for many "quick" studies not requiring high resolution, is to produce stereo pairs with a polaroid copy camera. It is possible to obtain stereo using both camera images (convergent stereo) by joining the two light tables (front to front) and viewing the selected area with the B&L Versatile Stereo Viewer". This method is awkward and time consuming. The fourth method utilized in this evaluation involved the employment of the fiber optics viewer. While this method produced satisfactory stereo it was also a time consuming process and is not considered feasible for use on an extensive basis during first phase mission read-out operations. A fifth method of obtaining stereo is to remove the frames covering the selected area and view the target with one of several suitable stereo viewers including the B&L Versatile Stereo Viewer.

(3) Other than the problem of obtaining stereo discussed above no problems of a unique nature were encountered during analysis of selected targets. The availability of both convergent and successive stereo of targets out to 30° from the flight line enhances target analysis (only successive stereo is available beyond 30°).

(4) The reporting procedures presently employed by the PAG are readily adaptable to the 116-A imagery. The excessive size of the film reels caused delays in scanning due both to the difficulty in handling

BYE-41873-65

SUBJECT: Imagery Evaluation, 116-A Camera

and the limitation on the number of analyst who could be employed (full rolls contained 107 frames). The X and Y references were obtained without difficulty utilizing the universal grid in the manner described in the TID memorandum, BYE-41849-65. Handling of the grid template was facilitated by trimming off all excess border area. Frame numbers are available in the binary data block but should be included in the man readable titling data in order to reduce analyst time and insure accuracy.

(5) The utilization of viewing equipment currently in use within the PAG for exploitation of the 116-A imagery presented several problems. The primary problem, that of obtaining stereo is outlined above. The format length dictates the use of a 9"x40" light table for full frame viewing though the 9"x18" light table can be used for scanning. However it is not feasible to use the 9"x18" equipment if X-Y references are required. Utilization of the Richardson Viewer for scanning is feasible though not considered necessary for the reasons listed earlier. The minimum successive frame overlap encountered was approximately 35%, thus the entire ground area covered by a single camera could be scanned on the Richardson in one continuous scan at the 5X enlargement position. It was found that the film width (8 inches) presented no particular problems with regard to the PAG exploitation equipment. The test imagery was evaluated in both 8" and 9" film widths (same image format size) and found satisfactory in each case. The standard 9" take-up reel was utilized in each case.

b. Objective II: Determine the amenability of the 116-A camera system imagery to the accomplishment of the various support functions involved in mission exploitation.

(1) The two major functions performed by the Technical Intelligence Division (TID), NPIC, that of "Mission Plotting" and "Mensuration", were examined. The methods developed by TID for accomplishing these tasks will meet the needs of the PAG.

(2) Analysis of the unique capability of the OXCART system to furnish mission data from an airborne data recorder with additional information presented in the binary block on the imagery was also examined. This examination included attempts to correlate man readable titling data (assumed for this test), binary block data and the mission flight data derived from the in-flight recorder.

(3) At present it is planned that the man readable data on each frame include frame number, camera, mission, date and classification. This is considered adequate in view of the fact that the latitude/longitude and elapsed time are coded in binary on each frame, as is the frame number.

BYE-41873-65

SUBJECT: Imagery Evaluation, 116-A Camera

(4) The print-out of the flight data recorder includes: V/H, aircraft altitude and heading, elapsed time, velocity, longitude and latitude. This data can be very useful to the photo interpreter as well as to the technical analyst. It should be noted however that the frame number is not included in this listing, thus there is no direct man-readable correlation between the listing and the imagery. Inclusion of the frame number in this listing would eliminate the need for decoding the data block and thus could save considerable analyst time.

(5) No unique problems were encountered with regard to reproduction of test imagery for analysis. As indicated earlier 9" film stock was used for contact size reproduction.

3. Summary and Conclusions: The PAG evaluation of the 116-A test imagery has revealed no critical shortcomings with regard to either the sensor system or to the PAG capabilities to exploit such imagery. Several problem areas which would detract from the efficiency with which the 116-A imagery may be exploited were identified. These include, the difficulty encountered in obtaining stereo viewing with present equipment; the utilization of large capacity film reels resulting in handling difficulties and exploitation delays; and the lack of a man readable correlation between the INS print-out and the imagery. A distinct advantage in handling flexibility and target analysis is derived from the multiple coverage resulting from the convergent and consecutive format overlap.

4. Recommendations: Based on the assumption that the most rapid exploitation possible consistent with accuracy will be required and that the timeliness of the information derived may be extremely critical, the following recommendations are submitted:

a. That a "work copy" du pos be reproduced during original film processing until such time as adequate stereo viewing equipment is available.

b. That the feasibility of cutting the "work copy" by frames at the time of reproduction (in order to expedite distribution of selected target coverage to photo interpretation teams) be determined.

c. That all other film copies be packaged on reels not to exceed 5 inches in diameter.

d. That a man readable correlation between the INS data print-out and the imagery (preferably the inclusion of frame numbers in the INS print-out) be furnished.

BYE-41873-65

SUBJECT: Imagery Evaluation, 116-A Camera

STAT

Assistant for Photographic Analysis, NPIC

Distribution:
1 & 2 - P&DS/NPIC ✓ 95
3 - Asst Ops/NPIC ✓
4 - PD/NPIC ✓ 77
5 - CSD/NPIC ✓ 01
6 - TID/NPIC ✓ 30
7 - PSD/NPIC ✓ 98
8 - IPD/NPIC ✓ 99
9 - IAD/CIA ✓ 97
10 - PAG/NPIC ✓
11 - IPO/PAG/NPIC ✓
12 - GMD/PAG/NPIC ✓
13 - SPO/GMD/PAG/NPIC ✓